

The Virginia Clean Marina Guidebook



The Virginia Clean Marina Guidebook



Commonwealth of Virginia
Virginia Clean Marina Program

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This manual is intended as an educational tool for marina operators and boaters. It does not constitute a complete reference to state, federal or local laws. Relying on the information in this book will not protect you legally. This book may not be relied upon to create a right or benefit substantive or procedural, enforceable at law or in equity by any person.

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Statement of Clean Marina Award Process

To become certified as a Virginia Clean Marina, a marina must meet all legal and regulatory standards and then meet a percentage of best management practices (BMPs) as outlined in the clean marina criteria checklist. These criteria are drawn directly from the best management practices described in the chapters in this guidebook. This system is set up for the simple reason that every marina is different. This allows each marina owner/operator flexibility to choose best management practices that fit his/her situation.

The process is simple. First, the checklist provided with this Guidebook must be filled out and sent in. (If the marina does not meet the minimum percentage of criteria on the checklist, they can join the Clean Marina Program as a pledge. This level gives the marina one year to implement BMPs before re-evaluation.) Second, members of the Marina Technical and Environmental Advisory Committee (MTEAC) will visit your marina and evaluate the business using your checklist as a guide. Third, if the marina meets the minimum criteria, they will be recommended for Clean Marina Status. The MTEAC will review the recommendation and, if the review is positive, the marina will be granted Clean Marina status and receive all the benefits therein. If the marina does not meet the minimum criteria, they can pledge to do so and apply for Clean Marina status at a future date. Pledges will receive public recognition by the Clean Marina Program, but they need to submit a yearly notice of their intent to continue working towards Clean Marina status.

To support the Clean Marina Program, the Marina Technical Advisory Program will conduct annual reviews of Clean Marinas, will hold workshops to continue providing education to marina owners, operators and staff, and will provide technical assistance on an as-needed basis.



COMMONWEALTH of VIRGINIA

Office of the Governor

James S. Gilmore III
Governor

Dear Friends:

As we begin the 21st century as a progressive and prosperous Commonwealth, we continue our commitment to protecting our natural resources while providing for the vigorous pursuit of economic opportunities. Virginia is blessed with abundant rivers and waterways that provide sustenance for our citizens, businesses, and communities, and enhance the quality of life for all Virginians. Our rivers and waterways offer us all the opportunity to enjoy boating, hunting, fishing, and various other outdoor activities. At the same time, these rivers and waterways provide habitat for many species of fish, birds, and other wildlife.

We are pressing forward in our efforts to control non-point source pollution, reduce erosion, restore riparian buffers, and reduce the quantity of nutrients entering our waterways in order to improve Virginia's water quality. The voluntary efforts and collaboration of individual citizens, businesses, and organizations helps preserve our waterways, providing long-term environmental benefits to people and wildlife. Careful stewardship of these rivers and waterways is essential to meeting our goal to restore water quality throughout the Commonwealth.

Recognizing that environmental education and technical assistance are key components to environmental stewardship, we established Virginia Naturally 2000. The goal of Virginia Naturally is to provide individuals with the knowledge they need to make informed decisions about their environment. We must continue to strengthen our environmental education efforts and maintain our commitment to improving water quality. The information developed as part of the Clean Marina Program will be made available electronically to ensure that all interested parties have an opportunity to participate in the program.

The Virginia Clean Marina Program provides the information and assistance Virginians need to protect and enhance water quality through voluntary efforts. The Clean Marina Guidebook presents practical and easy to implement tips for controlling pollutants associated with marinas and recreational boating. This Guidebook contains information on vessel maintenance, storm water, habitat and species, emergency planning, and more. The Clean Marina Program recognizes marina operators and others for their exemplary voluntary stewardship efforts and protection of Virginia's natural resources.

Thank you for using this resource guide. Adopting these pollution prevention practices will reduce harmful impacts to our natural resources and help ensure future generations have the same opportunities to experience and enjoy Virginia's rivers and waterways that we enjoy today.

Very truly yours,

James S. Gilmore, III
Governor of Virginia

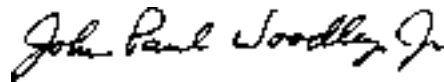
Forward:

The Coastal Zone Reauthorization Amendments (CZARA) of 1990 require all coastal states with approved Coastal Management Programs to develop Coastal Nonpoint Source Pollution Control programs to address nonpoint source runoff within the coastal zone. Nonpoint source (NPS) pollution is generated by agriculture, forestry, urban and suburban growth and redevelopment, and marina and recreational boating activities. At marinas, unchecked stormwater runoff from boatyards, drips from fuel docks, discharges from marine heads and fish waste all contribute to the loss of habitat, reduced water quality and fewer living resources.

In response to CZARA, Virginia submitted a report that describes the various laws, regulations and programs that allow Virginia to address NPS pollution. After reviewing the report, the United States Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) released their findings in February of 1998. The federal agencies determined that Virginia needed to do more to control nonpoint sources of pollution associated with marinas and recreational boating.

Based on these findings, Virginia was faced with the strong possibility of having to impose additional regulations on marinas. Fortunately, both NOAA and EPA supported Virginia's request to pursue the development of a voluntary program instead of imposing new regulations. With the help of an advisory committee made up of public and private representatives, Virginia has developed the Virginia Clean Marina Program. The goal is to provide technical assistance and promote education efforts to Virginia's marinas and recreational boaters. This voluntary approach has both economic and environmental benefits.

Virginia marinas and recreational boaters have been given an opportunity to avoid regulation by voluntarily adopting and implementing best management practices and a common sense approach to improving and maintaining water quality and living resources. I urge all marina operators and recreational boaters to embrace the challenges we face and to work with the Virginia Clean Marina Program to protect and improve our water resources, living resources, and the quality of life for those that live in and visit the Commonwealth of Virginia.



John Paul Woodley, Jr.
Secretary of Natural Resources

Dear Responsible Marina Operator:

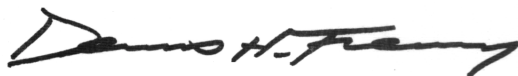
The Virginia Clean Marina Program represents an increased emphasis in Virginia on voluntary programs which *prevent pollution*. Historically, the approach to environmental protection was one of “command and control” which centered on compliance with and enforcement of ever-increasing environmental regulations. This program, and others like it, are focusing instead on “environmental management,” a concept that challenges businesses to go “beyond compliance” and to continuously improve their environmental performance towards an overall goal of “zero impact.”

The Virginia Department of Environmental Quality’s Office of Pollution Prevention has assisted in the development of this program; and the manual and the checklist have been developed with an emphasis on pollution prevention techniques, activities which focus on source reduction. Source reduction techniques such as product substitution, process changes, and new technologies, emphasize increased efficiency and can result in significant cost savings due to decreased waste disposal and even decreased raw material purchases. DEQ’s P2 staff will assist the clean marina staff in providing non-regulatory, technical assistance to marina operators in search of pollution prevention opportunities.

The Virginia Clean Marina Program represents an industry specific approach to responsible environmental management and pollution prevention that is similar to the Virginia Environmental Excellence Program (VEEP), Virginia’s program to promote the development of “environmental management systems.” Therefore, the criteria for the Clean Marina Certification have been designed so that facilities are automatically eligible to be designated as an “Environmental Enterprise” in the VEEP program (see www.deq.state.va.us/veep/); and you will be eligible for free recognition and assistance in association with this program as well.

Thank you for your commitment to protecting the environment and the waterways upon which you do business.

Sincerely,

A handwritten signature in black ink, appearing to read "Dennis H. Treacy".

Dennis H. Treacy, Director
Virginia Department of Environmental Quality

For pollution prevention assistance or more information on the Virginia Environmental Excellence Program, contact DEQ’s Office of Pollution Prevention at 804-698-4235 or jkcomfort@deq.state.va.us.

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Acknowledgments

The *Virginia Clean Marina Guidebook* was compiled by the Virginia Marina Technical and Environmental Advisory Committee with special help from state agency regulatory and pollution prevention staff. The committee would also like to thank the Clean Marina Initiative staff at the Maryland Department of Natural Resources for their assistance and for providing insights gained from the development of Maryland's Clean Marina Program. Much of the Virginia guidebook is modeled on this highly successful initiative. We look forward to partnering with our sister state on this and other important environmental programs to benefit citizens enjoying the shared resources of the Chesapeake Bay.

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All photos were taken by Sally Mills and Harrison Bresee of the Virginia Sea Grant Marine Advisory Service.

Drafts of the *Virginia Clean Marina Guidebook* were also reviewed by many additional subject area experts.

Abbreviations

ACA	Ammoniacal Copper Arsenate
ACOE	Army Corps of Engineers
ACZA	Ammoniacal Copper Zinc Arsenate
AST	Aboveground Storage Tank
BMP	Best Management Practice
BOD	Biological Oxygen Demand
BT	Bacillus Thuringiensis
CBC	Chesapeake Bay Commission
CBLAD	Chesapeake Bay Local Assistance Department
CCA	Chromated Copper Arsenate
CFC	Chlorofluorocarbons
CFR	Code of Federal Regulations
CMC	Center for Marine Conservation
Cu ₂ O	Cuprous Oxide
CVA	Clean Vessel Act
CZARA	Coastal Zone Act Reauthorization Amendments of 1990
DCR	Virginia Department of Conservation and Recreation
DEM	Virginia Department of Emergency Management
DEQ	Virginia Department of Environmental Quality
DGIF	Virginia Department of Game and Inland Fisheries
EPA	U.S. Environmental Protection Agency
ESC	(Virginia) Erosion and Sediment Control Program
HVLP	High-volume Low-pressure
IDA	Intensely Developed Area
IPM	Integrated Pest Management
JPA	Joint Permit Application
LDA	Limited Development Area
LID	Low Impact Development
MARPOL	International Convention on the Prevention of Pollution from Ships
MPPRCA	Marine Plastic Pollution Research and Control Act
MSD	Marine Sanitation Device
MSDS	Material Safety Data Sheets
MTAP	Marina Technical Advisory Program
MTEAC	Marina Technical and Environmental Advisor Committee
NDA	No Discharge Area
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
OAPC	Organotin Antifoulant Point Control Act
OPA	Oil Pollution Act
OSHA	Occupational Safety and Health Administration
PMB	Plastic Medium Blast
PWC	Personal Watercraft
QAC	Quarternary Ammonium Compounds
RCRA	Resource Conservation and Recovery Act
RPA	Resource Protection Area

SAV	Submerged Aquatic Vegetation
SEAS	Shoreline Erosion Advisory Service
SIC	Standard Industrial Code
SPCC	Spill, Prevention, Control and Countermeasure
SPSA	Southeastern Public service Authority
SWM	(Virginia) Stormwater Management Act
TBT	Tributyltin
TCLP	Toxicity Characteristic Leaching Procedure
TSS	Total Suspended Solids
UL	Underwriter's Laboratories
USC	United States Code
USCG	United States Coast Guard
USCGA	United States Coast Guard Auxiliary
USDOT	United States Department of Transportation
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
VAC	Virginia Administrative Code
VDH	Virginia Department of Health
VFPA	Virginia Fire Protection Association
VHWMR	Virginia Hazardous Waste Management Regulations
VIMS	Virginia Institute of Marine Science
VMRC	Virginia Marine Resources Commission
VOSH	Virginia Occupational Safety and Health Program
VPDES	Virginia Pollutant Discharge Elimination System
VSWMR	Virginia Solid Waste Management Regulations
VWPP	Virginia Water Protection Permit

Introduction

The Virginia Clean Marina Program is an effort to help marina and boatyard operators protect the resources that provide their livelihood: clean water and fresh air. These natural assets are essential features of the boating industry. Ironically, it is the enjoyment of these natural wonders that may lead to their decline.

The maintenance, operation and storage of recreational vessels has the potential to pollute adjacent waters and to impair air quality. Contaminants include dust from hull maintenance operations, solvents from engine repair shops, petroleum from careless fueling practices, sewage discharges from boats, and heavy metals from antifouling paints. These pollutants may be deposited directly into waterways or they may be carried in by stormwater runoff. Marina design and location may also contribute to environmental degradation by disturbing sensitive habitat areas.

This is not to say that marinas and boaters are the only contributors to environmental degradation. Quite the contrary is true. Water quality is impacted by fertilizers and pesticides applied by land owners (residential, commercial, and agricultural), by industrial discharges, sewage treatment plants, and by our choices of home cleaning products. It is affected by sediment washed down from cleared land and by stormwater runoff that collects oil and heavy metals deposited by our cars. Environmental degradation is not the result of any particular industry or user group. It is the consequence of all of our activities. As such, we all have an obligation to do what we can to minimize the negative environmental impacts of our actions. If we each take responsibility for that part of the problem which we can control—even if it seems insignificant—the cumulative result will be a cleaner, healthier environment.

By adopting the best management practices recommended throughout this *Guidebook*, you will demonstrate your commitment to environmental stewardship. You can be proud that you are doing your share to protect the natural resources upon which we all depend. Additionally, your marina or boatyard will be a safer, healthier place to work. You may be able to save money by reducing your costs for materials and for waste cleanup and disposal. You may increase your income by renting equipment such as vacuum sanders and by selling recyclable materials such as batteries and office paper. Similarly, cleaner, more efficient equipment will increase your staff's productivity. Your liability associated with waste handling may also be reduced. And, your facility will be more attractive to those who care about the health of our water, land, and air.

The Virginia Clean Marina Program seeks to promote clean water and fresh air by providing technical advice and educational material to marina operators and boaters. The goal is to encourage informed decision making that leads to a reduction in boating-related pollution. The *Virginia Clean Marina Guidebook* provides an overview of actions that marine industry professionals can take to protect water and air quality. It is written for managers of full service marinas with boatyards. The recommendations contained within, however, are equally applicable to marinas with limited

services, limited boatyards, and marine contractors. The *Guidebook* provides advice on the following topics:

- Siting Considerations and Marina Design For New and Expanding Marinas
- Marina Management
- Emergency Planning
- Petroleum Control
- Sewage and Gray Water
- Waste Containment and Disposal
- Vessel Maintenance and Repair
- Stormwater
- Habitat and Species
- Boater Education

Those marinas that adopt a significant proportion of the best management practices suggested within the *Guidebook* will be recognized as Virginia Clean Marinas. They will receive a certificate acknowledging their environmentally responsible actions, authorization to use the Virginia Clean Marina logo on their letterhead and in their advertising, a flag to fly from their property, and promotion by the Clean Marina Program in publications, on the world wide web, and at public events.

Now is the time to take a leadership role in protecting and enhancing the quality of Virginia's natural resources. Please, do your part.

If you have any BMPs you would like to share, please contact Harrison Bresee at (804) 684-7768 or hpbiii@vims.edu.

How to Use this Guidebook

The *Virginia Clean Marina Guidebook* is intended to be used as a reference document. Refer to selected chapters as needed. For example, as you prepare for spring commissioning, review the recommendations in the *Vessel Maintenance and Repair* chapter.

Six *Clean Boating Tip Sheets* are included in the *Guidebook*. They address vessel cleaning and maintenance, petroleum control, vessel sewage, waste containment and disposal, and severe weather. These tip sheets are meant to be photocopied and distributed to boaters.

Throughout the book you will find references to additional sources of information. Contact information is listed in Appendix I. Subsequent appendices contain information about environmentally sensitive landscaping, funding sources and grant programs for marinas, 6217 Guidance Management Measures, and recycling contacts.

Each chapter has three symbols defining the BMPs. ■ denotes laws and regulation(s). ⚙ denotes BMPs that are not required by law or regulation but are recommended because they are considered the better way to achieve the desired goal. ◇ denotes additional BMPs: these are other good recommendations and ideas for your marina.

Siting Considerations and Marina Design For New and Expanding Marinas

Environmental Concerns

The natural, plant, and animal communities of coastal areas serve multiple functions. Wetlands, for example, provide habitat for fish and fowl. They form a natural buffer against incoming storms and act as a filter to purify stormwater runoff from the land. Wetlands also minimize erosion and support tourism, hunting, and fishing. Because of the ecological, economic, recreational, and aesthetic values inherent in coastal resources, it is important that shoreside development not diminish these features.

Land management decisions, operating procedures, and structural improvements may all contribute to— or detract from— the quality of the land and water surrounding your marina. Roads and parking areas may convey polluted stormwater directly into adjacent waterways. Dredging may resuspend toxic compounds such as heavy metals, hydrocarbons, and synthetic chemicals. Hazardous chemicals may be leached into the water from piers and other similar structures. Broken or degraded floats may release buoyant debris that birds and fish mistake for food. Finally, the location and installation of shoreside and in-water structures may lead to accelerated coastal erosion and sedimentation. Sedimentation is the rain of soil particles through the water column. It may bury bottom dwelling organisms, block sunlight, reduce the feeding efficiency of visual feeders, clog fish gills, and eliminate submerged aquatic vegetation.

Goal

Avoid negative environmental impacts from new or expanding marinas.

Legal Setting

Local

Land Management Ordinances

Contact your local zoning board.

Bay Act Requirements

The Chesapeake Bay Act has specific requirements for building in lands adjacent to water. See the “Bay Act” section below.

Tidal Wetlands Permit

Permit required for any project that affects tidal wetlands. This permit is applied for through the Joint Permit Application (JPA) process. For further information, please see the “Joint Permit Application Process” below.

“Sedimentation is the rain of soil particles through the water column. It may bury bottom dwelling organisms, block sunlight, reduce the feeding efficiency of visual feeders, clog fish gills, and eliminate submerged aquatic vegetation.”

Coastal Primary Sand Dunes/Beaches Permit

A permit, obtained through the JPA process, is required for any project that affects coastal primary sand dunes or beaches. Some localities also use additional application procedures for dune and beach projects.

State

Subaqueous or Bottomlands Permit

Permit required for any project that affects submerged lands. Issued by the Virginia Marine Resources Commission (VMRC). See the “Joint Permit Application Process” section below.

Tidal Wetlands Permit

A permit is required for any project impacting tidal wetlands. In most localities, the local wetlands board issues the permit. In areas without a local wetlands board, the VMRC issues the permit.

Coastal Primary Sand Dunes/Beaches Permit

Permit required for any project that affects coastal primary sand dunes or beaches. The joint permit application may be used; however, some localities use additional application procedures for dune and beach projects.

Water Protection Permit

Any project that requires federal permits for discharge of dredge material or fill in a waterway or wetland, including nontidal wetlands, work or construction in a navigable waterway, or a water withdrawal will be reviewed by the Department of Environmental Quality (DEQ) for issuance of a Virginia Water Protection Permit (VWPP). Without the VWP permit (formerly called the 401 Certification) the federal permits will not be issued. See the “Joint Permit Application Process” section below.

Federal

Federal Rivers and Harbors Act of 1899

Section 9 of this Act prohibits the construction of any bridge, dam, dike or causeway over or in navigable waterways of the U.S. without authorization from the Coast Guard.

Section 10 of the Act, administered by the United States Army Corps of Engineers, requires permits for encroachment into navigable waters, such as the building of wharfs, jetties, or piers.

The Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act provides authority for the U.S. Fish and Wildlife Service (USFWS) to review and comment on the impacts on fish and wildlife of activities proposed to be undertaken or permitted by the Corps of Engineers.

Federal Water Pollution Control Act

The Federal Water Pollution Control Act, commonly known as the Clean Water Act, requires permits be issued for projects involving the discharge of dredged or fill material in Federal Waters, including tidal and nontidal wetlands. In addition, the Act provides the authority for the NPDES permit program to regulate point sources of pollution.

Furthermore, the Act prohibits the discharge of oil or hazardous substances into U.S. navigable waters and the use of chemical agents like soaps, detergents, surfactants, or emulsifying agents to disperse fuel, oil, or other chemicals without permission of the U.S. Coast Guard.

Joint Permit Application Process

A Joint Permit Application (JPA) is used to seek authorization for activities (structure, dredging, clearing, filling, etc.) which obstruct, alter, or result in the discharge of fill into waterways as well as tidal and nontidal wetlands. Contact your local wetlands board or the Virginia Marine Resources Commission (VMRC) for a copy of the application.

The Joint Permit Application process: Complete all appropriate sections and send to the VMRC. The VMRC acts as a clearinghouse for the applications and issues copies to many state and local agencies, including: the Virginia Department of Environmental Quality (DEQ), the Corps of Engineers, the Virginia Institute of Marine Science (VIMS), and local land use offices. The VMRC reviews the application for encroachment into state owned lands and, if encroachment is noted, issues permits accordingly. Prior to the issuance of this permit the Virginia Department of Health must approve the sanitary facilities (sewage disposal, public water system and toilets) for new or expanding marinas. VIMS, through their Wetlands Advisory Program, provides a report to all involved agencies on the marine environmental impacts of the project. Local wetlands boards use this report and other factors to make their decision on issuing a Tidal Wetlands Permit for any impacts to tidal wetlands. The DEQ is responsible for issuing the Virginia Water Protection Permit (VWPP). Finally, the Corps of Engineers coordinates the application with the Environmental Protection Agency, the US Fish and Wildlife Service (FWS), and the National Marine Fisheries Service before they issue a permit. Each agency involved with the process issues a separate permit.

In addition to these permits, contact your local government land use office to ensure that the proposed project meets local ordinances and secure any appropriate building permits necessary to build or expand the marina.

Chesapeake Bay Preservation Act

The Virginia General Assembly enacted the Chesapeake Bay Preservation Act in 1988. The Bay Act is designed to improve water quality in the Chesapeake Bay and its tributaries by requiring wise resource management practices in the use and development of environmentally sensitive land features. While the Bay Act is a state law, it is implemented by the local governments of Coastal Virginia.

In accordance with state criteria, Tidewater localities have designated environmentally sensitive lands as Chesapeake Bay Preservation Areas (CBPAs). Any development occurring in these areas must meet certain performance standards designed to reduce water quality impacts. The most sensitive lands within CBPAs are designated as Resource Protection Areas (RPAs). RPAs include tidal wetlands and shores, certain nontidal wetlands and streams, and a 100-foot vegetated buffer adjacent to each of these features. Because these lands are so sensitive, development within RPAs is limited to water dependent uses such as marinas and piers, or the

redevelopment of already developed areas. Structures associated with marinas that are not water dependent, such as parking lots, tackle shops, and dry storage areas, are not permitted in RPAs.

The Bay Act also requires that Tidewater localities adopt comprehensive plans that incorporate water quality protection measures consistent with the goals and objectives of the Bay Act. One of the policy areas to be included in local plans is public and private access to waterfront areas. Under this topic, localities typically include a discussion of the water quality issues associated with existing marinas and their criteria for evaluating proposed marinas. Anyone interested in developing or expanding a marina in Tidewater, Virginia should contact the local government to obtain information on the Bay Act provisions of that locality's comprehensive plan and land management ordinances as they apply to marinas.

Best Management Practices For Siting

Redevelop Existing Sites

- ✳ Place new facilities in previously developed waterfront sites.
- ✳ Expand marinas into previously developed sites.
- ✳ Check with your local government for preferred redevelopment activities and locations.

Avoid Rare and Endangered Species

- Rare and endangered species may not be disturbed (Federal & State Endangered Species Act/Legislation).
- If protected species are identified, you must implement an approved protection plan prior to project approval.
- ✳ For a preliminary screening of a project site, contact the Department of Game and Inland Fisheries, the Department of Conservation and Recreation's Natural Heritage Division, or the US Fish and Wildlife Service.

Avoid Submerged Aquatic Vegetation - Submerged aquatic vegetation (SAV) provides habitat for shellfish and finfish and food for waterfowl.

- Avoid disturbing or shading SAV.
- ✳ Avoid creating situations where secondary impacts on SAV by boat traffic (i.e. prop scarring) or wakes (i.e. erosion) can occur.

Minimize Disturbance to Wetlands

- Avoid disturbance to wetlands and indigenous vegetation in riparian areas.
- ✳ Build open piled docks at a height minimizing shading impacts to marshes (build docks at least 1 foot in height above substrate for every 1 foot of dock width).
- ✳ Remove foreign materials (trash) from wetlands.

Avoid Shellfish Waters - Avoid new and expanding marinas that result in the condemnation of shellfish waters. The Division of Shellfish Sanitation of the State Health Department has established a policy which requires the establishment of buffer zones around boat mooring facilities within which shellfish cannot be harvested for direct marketing during the months of April through October.

"The Bay Act is designed to improve water quality in the Chesapeake Bay and its tributaries by requiring wise resource management practices in the use and development of environmentally sensitive land features."

■ Legally Required

✳ Highly Recommended BMPs

◇ Suggested BMPs

- ✧ Do not site a marina near active shellfish harvesting or culturing areas.

Avoid Critical Migration, Nesting, and Spawning Areas for Location and Construction – Regional waterfowl populations converge in certain areas to breed and feed during specific times of year. The preservation of historic nesting and staging areas is vital to the continued existence of many waterbird species. Marinas must be located such that the increased boating activities associated with new or expanded marinas do not deter waterfowl from using historic staging and concentration areas.

- ✧ Disturbance of waterfowl staging areas by marinas and increased boat traffic should be avoided.
- ✧ Schedule construction to avoid critical migration, nesting, and spawning periods of important finfish, shellfish, and wildlife.

Consider Bottom Configuration

- ✧ Locate marinas on well flushed, natural waterways.
- ✧ A continuous, gradual downward slope from the berthing area into deeper water is ideal.
- ✧ Avoid locating in canals, irregular pockets, and sumps that are deeper than adjacent channels.
- ✧ Avoid dead-end canals to the greatest extent possible.
- ✧ Build docks in areas with water depths greater than 3 feet at mean low water.

Minimize Impervious Areas to Reduce Runoff

- ✧ Impervious areas such as concrete pads and asphalt roads funnel water to specific areas. By maintaining areas with grass or gravel or other areas that let water percolate, water and the pollutants (fertilizer, etc.) it picks up are filtered naturally before reaching the waters of your marina.
- ✧ Keep paved areas to an absolute minimum, i.e., just designate work areas and roadways for heavy equipment.

Use Upland and Inland Areas – This offers a two-fold benefit. First, by using upland or inland areas, the disturbance to sensitive shorelines is diminished. Second, upland and inland areas can be far enough away from the water to allow for the natural filtering of pollutants.

- ✧ Locate buildings, workshops, and waste storage facilities in upland areas, away from fragile shoreside ecosystems, to the greatest extent possible. Upland areas also provide a measure of protection against floods.
- ✧ Locate parking and vessel storage areas away from the water, where feasible.
- ✧ Consider inland areas for boat repair activities and winter storage. Use hydraulic trailers to quickly and easily move boats to inland storage locations.

Siting Criteria Check List

Adopted from The Virginia Marine Resources Commission's Publication:
Subaqueous Guidelines

The following criteria will be considered by the Virginia Marine Resources Commission in determining whether and upon what condition to issue any permit for a boat mooring facility. In addition, the Commission may consider other factors relevant to a specific project or application.

<u>Criteria</u>	<u>Undesirable</u>	<u>Desirable</u>
Water Depth	Less than 3 ft. mlw.	Greater than 3 ft. mlw.
Salinity	Suitable for shellfish growth.	Unsuitable for shellfish growth.
Water Quality	Approved, conditionally approved or seasonally approved for shellfish harvesting.	Closed for direct marketing of shellfish. Little or no potential for future productivity.
Designated Shellfish Grounds	Private leases or public oyster ground in proximity.	No private leases or public ground within affected area. No potential for future productivity.
Maximum Wave Height	Greater than 1 ft.	Less than 1 ft.
Current	Greater than 1 knot.	Less than 1 knot.
Dredging	Requires frequent dredging. No suitable site for dredged material.	Does not require frequent maintenance. Suitable for all dredged material.
Flushing Rate (Tidal Exchange)	Inadequate to maintain water quality.	Adequate to maintain water quality.
Proximity to Natural or Improved Channel	Greater than 50 ft. to navigable water depths.	Less than 50 ft. to navigable channel.
Threatened or Endangered Species	Present as defined in existing regulations, or project has potential to affect habitat.	Absent; project will not affect.
Adjacent Wetlands	Cannot maintain suitable buffer.	Suitable buffer to be maintained.
Navigation and Safety	Water body difficult to navigate or presently overcrowded conditions exist.	Navigation not impeded.
Existing Use of Site	Presently used for skiing, crabbing, fishing, swimming or other potentially conflicting uses.	Not presently used for skiing, fishing, swimming or other recreational uses.

Information Sources

See Appendix 1

Army Corps of Engineers

Chesapeake Bay Local Assistance Department

Department of Conservation and Recreation - Division of Natural Heritage

Division of Soil and Water Conservation - Shoreline Erosion Advisory Service (SEAS)

Department of Game and Inland Fisheries

Virginia Department of Health - Department of Shellfish Sanitation

Local Planning District Commissions

Local Planning Offices - (zoning and site plan review requirements)

Local Wetlands Boards are listed in Appendix I

US Fish and Wildlife Service

Virginia Department of Environmental Quality

Virginia Institute of Marine Science - Marina Technical Advisory Program, and Wetlands Program

Virginia Marine Resources Commission

Legally Required ■

Highly Recommended ★
BMPs

Suggested BMPs ◇

Criteria

Undesirable

Desirable

Submerged Aquatic Vegetation

Present.

Absent.

Shoreline Stabilization

Bulkheading required.

Shoreline protected by natural or planted vegetation or riprap.

Erosion Control Structures

Groins and/or jetties necessary.

No artificial structures needed.

Finfish Habitat Usage

Important spawning and nursery area.

Unimportant area for spawning or nursery for any commercially or recreationally valuable species.

Best Management Practices For Design and Maintenance

Use Fixed or Floating Piers to Enhance Water Circulation - While being mindful of the need for pier/dock systems to provide access during routine operations and under emergency circumstances (i.e., evacuation preceding or during a storm), piers, and other structures should be placed to enhance, rather than to obstruct, water circulation.

- ★ Select an open design for new or expanding marinas. Open marina designs have no fabricated or natural barriers to restrict the exchange of ambient water and water within the marina area. Install wave attenuators to reduce the force of incoming water, if protection is necessary.
- ★ Design new or expanding marinas with as few segments as possible to promote circulation within the basin. The fewer the segments, the better the circulation.
- ◇ Identify options to improve areas with poor water circulation.

Use Environmentally Neutral Material

- ★ For new pilings and other structures that are in or above the water, use materials that will not leach hazardous chemicals into the water and which will not degrade in less than ten years time; i.e., reinforced concrete, coated steel, recycled plastic, plastic reinforced with fiberglass may be preferable.
- ★ Be sure to contain shavings when field cutting plastic pilings and timbers.
- ★ Purchase floatable foams that have been coated or encapsulated in plastic or wood. As these floats age, degraded foam is contained by the covering.

Limit Shaded Areas Over the Water

- ◇ Near-shore, bottom-dwelling organisms require sunlight. In order to provide them with as much sunlight as possible, limit the number of covered slips.

Minimize the Need for Dredging - New marinas must be located in areas where access can be obtained with a minimum of excavating, filling,

and dredging. Existing marinas that require maintenance dredging more frequently than once every four years should investigate practicable options to increase circulation or reduce sediment accumulation. A permit is required for dredging operations (see joint permit application section above).

- ★ Extend piers and docks into naturally deep waters.
- ★ Locate slips for deep draft boats in naturally deep waters.
- ★ Dredge channels to follow the course of the natural channel.
- ★ Co-locate entrance channels with natural channels.
- ◇ Avoid locating the entrance channel perpendicular to the natural channel as shoaling (and, therefore, dredging) is a potential problem.
- ◇ Where possible, establish two openings at opposite ends of the marina to promote flow-through currents.
- ◇ Provide dry storage for smaller boats.

Minimize the Impacts of Dredging

- Select an appropriate disposal site and containment design. The disposal site must have minimal impact on public safety, adjacent properties, and the environment.
- Do not dredge during critical migration or spawning periods of important species of finfish or shellfish.
- ★ Avoid colonial waterbird nesting areas and historic waterfowl staging and concentration areas.
- ★ Use dredging methods, like hydraulic dredging, that minimize environmental impacts when large dredge volumes are involved.
- ★ Use turbidity curtains to contain suspended sediments where appropriate.

Employ Nonstructural Shore Erosion Control Measures

- ★ Nonstructural measures, such as beach nourishment, marsh creation, and other methods that encourage the preservation of the natural environment, are the preferred methods of shore erosion control.
- ◇ If nonstructural measures alone are not sufficient to control erosion, use revetments, breakwaters, or groins to stabilize and ensure the long-term viability of the nonstructural controls.

Maintain Structures Using Clean Marina Practices

- ★ Scrape, sand, and paint in-water and landside structures according to the same management principles as for vessels. (See Chapter on Vessel Maintenance—page 57.)
- ★ If possible, move floating structures to shore for scraping, painting and major repairs.
- ★ Maintain structures in good working order and remove abandoned structures.

Conserve Water

- ★ Equip all freshwater hoses with automatic shut-off nozzles.
- ★ Fix leaks and drips.
- ★ Install “low-flow” faucets, toilets, and shower heads.

Resources

1. www.vims.edu/ccrm/wetlands/handbook/: Includes the Virginia Wetlands Management Handbook in .pdf format. This handbook includes the *Wetlands Guidelines* written by VIMS and VMRC.
2. *Subaqueous Guidelines*: VMRC
3. *Shoreline Development BMPs*: VMRC
4. *Laws of Virginia Relating to Submerged Lands, Wetlands and Coastal Primary Sand Dunes and Beaches*: VMRC
5. *Virginia Erosion and Sediment Control Handbook for Standards and Specifications*: Virginia Department of Conservation and Recreation (DCR)
6. *Stormwater Handbook*: DCR
7. *Shoreline Management in the Chesapeake Bay*: VIMS
8. <http://laws.fws.gov>: Lists many federal laws with explanations in easy to read language.

■ Legally Required

Highly

- ★ Recommended BMPs

- ◇ Suggested BMPs

Marina Management

Environmental Concerns

Marina operators expend a high level of effort to improve operations. The success of this effort is accomplished through proper management activities. Having a well trained staff may be the most important element as boaters and independent contractors will frequently look to them for information and advice.

Goals

1. Retain/educate a staff capable of accomplishing BMPs.
2. Keep patrons and independent contractors current on BMP guidelines at the marina.
3. Maximize publicity of the marina's efforts to "do the right thing."

Legal Setting

State

For water transportation facilities that have point source storm water discharges from industrial activity areas (vehicle maintenance shops and/or equipment cleaning operations - specifically facilities with an SIC code Major Group 44), a Virginia Pollution Discharge Elimination System's (VPDES) Storm Water Permit is required (application available at: <http://www.deq.state.va.us/permits/water.html>). It includes a requirement for a storm water pollution prevention plan (SWPPP) to be developed for the facility to control the discharge of pollutants in storm water runoff to the maximum extent practicable. Among other things, the SWPPP requires employees to receive training at least annually (once per year) on the following areas if applicable to the facility: used oil management; spent solvent management; proper disposal of spent abrasives; proper disposal of vessel wastewaters; spill prevention and control; fueling procedures; general good housekeeping practices; proper painting and blasting procedures; and used battery management. (See the Stormwater Chapter for more detailed information on the SWPPP.)

Training is required for Material Safety Data Sheets-OSHA/VOSH.

Best Management Practices

Staff Training - A well trained staff will routinely minimize pollution, independently answer patrons questions, and perform their duties more efficiently. The proper training will also contribute to a faster response time during emergencies.

- Train Staff on the following components of the Stormwater Pollution Prevention Plan:
 - Used oil management
 - Spent solvent management

"A well trained staff will routinely minimize pollution, independently answer patron's questions, and perform their duties more efficiently."

- Proper disposal of spent abrasives
- Disposal of vessel wastewater
- Spill prevention and control
- Fueling procedures
- General good housekeeping
- Painting and blasting procedures
- Used battery management

Emergency Response Plans

- ★ Review plans and response procedures with staff at the beginning of each boating season.
- ★ Train employees in the use of containment measures.
- ★ Run emergency response drills at least twice annually.
- ◇ Invite the U.S. Coast Guard and local fire department to demonstrate emergency response procedures at your marina.

Approach Polluting Customers (Conflict Resolution)

- ★ Determine who will address boaters and contractors who are polluting. Generally speaking, this is a job for the manager. Let your staff know whether they should handle polluters themselves or report pollution incidents to the manager.
- ★ Politely inform boaters and contractors why what they are doing is harmful. Describe a more environmentally sensitive method and ask the boater or contractor to stop work until it can be done with less environmental impact. It will be easier to get cooperation if you require boaters and contractors to practice pollution prevention as a condition of their contracts.
- ◇ If the problem persists, take these additional steps:
 - Talk to the boater or contractor again.
 - Mail a written notice asking that the harmful practice stop. Keep a record of the mailing.
 - Remove the problem from the dock. Charge the boater or contractor for the cost of removal and clean-up.
 - Ask the tenant or contractor to leave your marina.

Maintain Records of Training

- ★ Record training dates, topics, and names of employees and instructors.
- ★ Keep copies of instructional material.

Train Employees to Notice and Halt these Activities

- ★ Colored plumes in the water where a hull is being cleaned
- ★ Bilge water discharge with a sheen
- ★ Uncontained sanding, painting, varnishing, or cleaning
- ★ Maintenance debris being washed into the water
- ★ Sewage discharges within the marina
- ★ The use of environmentally harmful cleaning products

■ Legally Required

★ Highly
Recommended
BMPs

◇ Suggested BMPs

Educate Patrons and Independent Contractors - Proper information dispersal to patrons and contractors will minimize the chances of accidental pollution which could save the business from costly cleanup and disposal expenses. (Good staff training will minimize the instances of intentional pollution.)

★ Incorporate BMPs into Contracts

- Include language requiring the use of BMPs in all of your contracts: slip holders, liveaboards, transients, charters, workers, contractors, and tenants.
- Clearly outline consequences for not using BMPs.
- Include information about BMP requirements.

★ Post Signs Detailing BMPs

- Post signs in visible places: fuel docks, pumpout stations, vessel maintenance areas, dumpsters, recycling stations, etc. (See examples on pages 14 and 15.)
- Be sure signs are visible, durable, eye catching, and large enough to read easily.
- Post your facility's environmental policy in a conspicuous location.

★ Host a Clean Marina Workshop

- Include a walking tour of the facility to demonstrate best management practices.
- Try to schedule the workshop to coincide with an existing marina function that is traditionally well attended.
- Offer incentives to attendees: door prizes, discounts, product samples, food.

★ Publicly Recognize Good Customers

- Put their picture and a note on the bulletin board, the newsletter, etc.

◇ Distribute Literature to Customers

- Copy and distribute the Clean Boating Tip Sheets included in this guidebook or create your own.
- Send tip sheets with monthly mailings.
- Include BMP articles in newsletters.
- Get free copies of clean boating materials from organizations such as the Marina Technical Advisory Program at VIMS, the Chesapeake Bay Foundation, the Center for Marine Conservation, and Boat/U.S. Clean Water Trust.
- Contact the U.S. Coast Guard for publications summarizing federal boating requirements.

◇ Utilize Casual/Verbal Contact

- Pass along pollution prevention information in conversations with patrons and contractors.
- Erect and maintain a marina bulletin board.

Public Relations

◇ Publicize Your Good Deeds

- Seek free publicity with the local press, magazines, television, and radio outlets.
- Prepare news releases to highlight innovative practices, new equipment or services, available literature, or a workshop you are sponsoring at your marina that coincide with seasonal activities (such as a news release on your new pumpout system that will be in place for the local oyster festival).
- Learn media deadlines and send releases in time to meet them.
- News Release Format: Start news releases with a contact person's name and phone number, the date, and a headline. The first paragraph should contain vital information: who, what, when, and where. Fill in with secondary information and support data. Conclude with a "call to action" (i.e., visit the marina for a demonstration of the new plastic media blasting system). Double-space the text. One page is best. It should be no longer than two pages. Refer to the *Associated Press Style Book* for additional formatting information.
- Get press kits from manufacturers of environmentally sensitive products. Use their photographs and product information.

Be Involved in Volunteer Efforts

★ Become a Virginia Clean Marina

- Apply to the Virginia Clean Marina Program for recognition as a Virginia Clean Marina. Once you have satisfied the selection criteria, you may use the Virginia Clean Marina logo in your advertising and correspondence, fly a Clean Marina flag, and enjoy promotion by the Clean Marina Program in publications, on the World Wide Web, and at public events.
- Use your selection in the program as an opportunity to prepare a press release.

★ Sponsor an Oyster Restoration Effort

- Oysters are natural water filters that improve water quality by filter-feeding on microscopic algae. A single 3-inch oyster can filter up to 50 gallons of water a day. Developing an oyster float in your marina is simple, helps filter the water, and acts as a point of interest for customers. Contact the Tidewater Oyster Gardener's Association (see Appendix I) for more information.

★ Sponsor a Beach Cleanup in Your Area

★ Join the Adopt-a-Stream Program.

- Virginia's Adopt-A-Stream is a litter education and cleanup campaign aimed at promoting citizen stewardship of the Commonwealth's water resources. The program is meant to reduce litter entering Virginia's waterways, promote education and outreach, and facilitate community involvement.

"Become a Virginia Clean Marina"

"Sponsor an Oyster Restoration Effort"

"Sponsor a beach cleanup in your area"

"Join the Adopt-a-Stream program"

■ Legally Required

Highly

★ Recommended BMPs

◇ Suggested BMPs

Information Sources

Center for Marine Conservation

Chesapeake Bay Foundation

Department of Conservation and Recreation, Division of Natural Heritage

Virginia Department of Environmental Quality

Virginia Institute of Marine Science's Marina Technical Advisory Program

US Coast Guard

US Coast Guard Auxiliary

International Marine Institute

Business Practices

✧ Maintain Structures Using Clean Marina Practices

- Scrape, sand, and paint in-water and landside structures according to the same management principles as for vessels. (See Chapter on Vessel Maintenance—page 63.)
- Move floating structures to shore for scraping, painting, and major repairs (if possible).

✧ Set an Example for Your Boaters/Employees. They will follow your example.

✧ Sell environmental products (especially if you require them for BMPs) in your marina store.

◇ Offer Environmental Audits for Boaters

◇ Inspect engines, bilges, fuel systems, and marine sanitation devices (the most common cause of water pollution from boats).

◇ Avoid environmental surcharges by charging for tangible items such as tarps, vacuum sanders, and protective clothing.

◇ Consider donating a portion of rental fees (i.e., for vacuum sanders) to an environmental organization. Let the boater and the press know about this practice.

Example Signs:

OIL SPILL RESPONSE KIT



Include name and number of person to contact at the marina in case of a spill.

Be sure that a copy of the Oil Spill Response Plan is clearly visible inside the Spill Response Kit.

KEEP FUEL OUT OF WATER

Do Not Top Off Tank
Listen to Anticipate When Tank is Full
Wipe-up Spills Immediately

PUMPOUT STATION

- Instructions for use
- Hours of operation
- Fee
- Name and number of person to call in case of malfunction.

- NOTICE -

The Federal Water Pollution Control Act prohibits the discharge of oil or oily waste into or upon the navigable waters of the United States or the waters of the contiguous zone if such discharge causes a film or sheen upon, or discoloration of, the surface water. Violators are subject to a penalty of \$5,000.

The use of soaps to disperse oil is illegal. Violators may be fined up to \$25,000 per incident.

Report Oil Spills to
USCG at (800) 424-8802

THINK BEFORE YOU THROW AWAY

The following items may not be placed in this dumpster:

- Oil
- Antifreeze
- Paint or varnish
- Solvents
- Pesticides
- Lead batteries
- Transmission fluid
- Distress flares
- Loose polystyrene peanuts
- Hazardous wastes

VESSEL MAINTENANCE AREA

- All major repairs (i.e., stripping, fiberglassing) must be performed in the Vessel Maintenance Area.
- All blasting and spray painting must be performed within the enclosed booth or under tarps.
- Use tarps or filter fabric to collect paint chips and other debris.
- Use vacuum sander (include rental information if appropriate).
- Use high-volume low-pressure spray guns sander (include rental information if appropriate).
- Use drip pans with all liquids.
- Reuse solvents.
- Store waste solvents, rags, and paints in covered containers.

NO FISH SCRAPS

Please do not discard fish scraps within the marina basin

- Use our fish cleaning station
- Bag the scraps and dispose in dumpster or at home
- Save and dispose over deep water

- RECYCLE OIL -

This container is for:

- Engine oil
- Transmission fluid
- Hydraulic fluid
- Gear oil
- #2 Diesel
- Kerosene

Tailor to fit your hauler's requirements.

Gasoline is **STRICTLY PROHIBITED**

If container is locked, include information about where to find the key or leave the oil.

**THANK YOU
FOR KEEPING
THE BAY CLEAN
AND SAFE!**

DO NOT DISCHARGE SEWAGE

Please use our clean, comfortable restrooms while you are in port.

Nutrients and pathogens in sewage impair water quality.

- RECYCLE -

Oil	Mixed Paper
Antifreeze	Newspaper
Lead batteries	Solvents
Glass	Steel
Plastic	Scrap Metal
Aluminum	Tin
Corrugated cardboard	Tires
Metal fuel filter canisters	

Indicate which items you recycle and where the collection sites are located.

Include information about local recycling services for materials that you do not collect.

- RECYCLE ANTIFREEZE -

This container is for:

- Ethylene glycol antifreeze
- Propylene glycol antifreeze

Tailor to fit your hauler's requirements.

Gasoline, diesel, kerosene, and all other materials are **STRICTLY PROHIBITED**.

If container is locked, include information about where to find the key or leave the antifreeze.

MARINE SANCTUARY

This marina provides food and shelter for young fish.

- Prevent oil spills!
- Keep bilge clean!
- Use oil absorbent pads!

Help by recycling or properly disposing of used oil, antifreeze, solvents, cleaners, plastics, and other wastes.

ENVIRONMENTAL POLICY

It is the policy of this marina to protect the health of our patrons, staff and the environment by minimizing the discharge of pollutants to the water and air.

Emergency Planning

Environmental Concern

A number of situations may occur in a marina that require immediate response. Calling 911 may be appropriate in some instances, but additional staff response is also called for in nearly every emergency situation. Without preparation, important steps can be overlooked and without a quick reference guide, the best of intentions may not produce the best actions for solving the occasional, but intense problem.

Goal

Plan for emergencies in advance in order to minimize any negative effects of emergency situations. Train employees about these plans.

Legal Setting

Federal

The US Coast Guard must be notified any time a spill produces a sheen on the water. Call the National Response Center at 1-800-424-8802. Report the location, source, size, color, substance, and time of spill. Failure to report a spill may result in fines.

Environmental Protection Agency's Spill Prevention, Control, and Countermeasure Plan (SPCC):

The Environmental Protection Agency's Oil Pollution Prevention Regulations require that marinas prepare and implement a plan to prevent any discharge of oil into navigable waters or adjoining shorelines if the facility has:

- an above ground oil storage capacity greater than 660 gallons in a single container;
- an aggregate above ground storage capacity greater than 1,320 gallons; or
- a total underground storage capacity greater than 42,000 gallons.

Oil is defined in the SPCC regulations (40 CFR 112) as "oil of any kind or in any form, including but not limited to petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil and oily mixtures."

The plan must address:

- operating procedures implemented by the facility to prevent oil spills;
 - control measures installed to prevent a spill from entering navigable waters or adjoining shorelines; and
 - countermeasures to contain, cleanup, and mitigate the effects of an oil spill that impacts navigable waters or adjoining shorelines.
- The SPCC plan must be certified by a professional engineer and kept on site for EPA to review. If a single spill of greater than 1,000 gallons occurs or two discharges of harmful quantity occur within

one year, a copy of the SPCC plan must be submitted to EPA Region III.

State

No state emergency requirements

Best Management Practices

Petroleum

- Prepare a Spill Prevention, Control, and Countermeasure (SPCC) Plan.

The Environmental Protection Agency's Oil Pollution Prevention Regulation requires that marinas prepare and implement a plan to prevent any discharge of oil into navigable waters or adjoining shorelines if the facility:

- Has an above ground oil storage capacity greater than 660 gallons in a single container;
- An aggregate above ground storage capacity greater than 1,320 gallons; or
- A total underground storage capacity greater than 42,000 gallons.

Oil is defined in the SPCC regulations (40 CFR 112) as "oil of any kind or in any form, including but not limited to petroleum, fuel oil, sledge, oil refuse, and oil mixed with wastes other than dredged spoil and oily mixtures."

The plan must address:

- Operating procedures implemented by the facility to prevent oil spills;
- Control measures installed to prevent a spill from entering navigable waters or adjoining shorelines; and
- Countermeasures to contain, cleanup, and mitigate the effects of an oil spill that impacts navigable waters or adjoining shorelines.

The SPCC plan must be certified by a professional engineer and kept onsite for EPA review. If a single spill of greater than 1,000 gallons occurs or two discharges of harmful quantity occur within one year, a copy of the SPCC plan must be submitted to EPA Region III.

- Maintain oil spill response equipment

- Maintain enough oil spill response equipment to contain the greatest potential spill at your facility.
- Store enough boom to encircle the largest vessel in your facility. Vessel length X 3 = required length of boom.

■ Legally Required

★ Highly
Recommended
BMPs

◇ Suggested BMPs

"Plan for all types of hazards by making a list of possible problems for your marina."

"Where"

"Who"

Maintain Material Safety Data Sheets

- Keep a file of Material Safety Data Sheets (MSDS) for all products used at your facility, as required by the Occupational Safety and Health Act of 1970 (29 USC Sec. 657). Store the file in an office away from material storage areas. Keep in mind during an emergency that this file will not tell you what quantity is on site or even whether all materials listed are present.
- Inform the local Emergency Planning Committee what materials you store and what is released when they burn.

Assess Coastal Hazards - Plan for all types of hazards by making a list of possible problems for your marina. Consider the list below as a starting point. (For instance, you may have an airport nearby and would want to have a plan for a plane crash.) Make sure you consider all threats that involve hazardous materials and designate a conscientious response person for any emergencies involving these materials.

✧ Consider and plan for likely threats - Manmade:

- Fuel spill
- Holding or water tank filled with gas
- Spill at the storage area: used oil, antifreeze, solvents, etc.
- Fire
- Health emergency

✧ Consider and plan for likely threats - Natural:

- Nor'easter
- Hurricane
- Tornado
- Flood

Develop Emergency Response Plans

- ✧ Develop written procedures describing actions to be taken under given circumstances. The plans should be clear, concise, and easy to use during an emergency, i.e., use a large type size. Each emergency response plan should contain the following information:

Where:

- In the very front of the plan, insert a laminated 11 X 17 inch site plan of the facility showing valves, pipes, tanks, structures, roads, hydrants, docks, power and fuel shutoffs, hazardous material storage locations, and telephones.
- Describe where the response material is located.

Who:

- Identify who is responsible for taking what action, i.e., deploying equipment, contacting emergency agencies, etc.
- Designate one person on the marina staff as the official spokesperson for the facility.
- Include a list of emergency phone numbers: U.S. Coast Guard's National Response Center (800) 424-8802, State agencies to be notified (DEQ and DEM), local fire and police

departments, owner, neighboring marinas that have emergency response equipment, and spill response contractors.

- Include a brief description of each agency's jurisdiction and information about what type of equipment and services are available from neighboring marinas and spill response firms.

What:

- State what action should be taken during an emergency and, based on likely threats, what equipment should be deployed. Include information about what type of equipment is available on site and what its characteristics and capabilities are.
- Characterize the facility's waterfront and vessels.
- Describe the type, amount, and location of materials stored on site, i.e., petroleum and hazardous materials.

How:

- Explain how the equipment should be used and disposed.

When:

- Indicate when additional resources should be called for assistance.
- Update the plans annually to include any new technology or equipment and to confirm phone numbers.
- Obtain and fill out a "Panic File"—put the panic file in a conspicuous place (near a phone in the office). This file contains headings for all types of emergencies from medical to fire to poisoning to storms. There is a location for emergency phone numbers as well.
- Contact local emergency providers to obtain basic information regarding how to handle emergencies and for training opportunities.

Make Plans Accessible

- ✦ Keep copies of all Emergency Response Plans in a readily accessible location.
- ✦ Place a second copy of the SPCC Response Plan in the oil spill response kit.

Train Employees on Emergency Procedures

- ✦ Review plans and response procedures with staff at the beginning of each boating season.
- ◇ Train employees in the use of containment measures.
- ◇ Run emergency response drills at least twice annually.
- ◇ Invite the U.S. Coast Guard and local fire departments to demonstrate emergency response procedures at your marina.

"What"

"How"

"When"

■ Legally Required

Highly
✦ Recommended
BMPs

◇ Suggested BMPs

"Invite the local fire marshal to visit your marina annually to train employees. These annual visits will also help the fire department to become familiar with your facility."

Information Sources

Department of
Environmental Quality

Virginia Department of
Emergency Services:
*The Handbook For Marina
Owners and Operators for
Hurricane and Severe
Weather Preparedness*

Virginia Institute of Marine
Science, Marina Technical
Advisory Program

US Coast Guard District 5

Education

Provide educational
materials to boaters

Train staff on emergency
procedures

Be Prepared for a Fire

- ✧ Meet the National Fire Protection Association's standards for marinas: NFPA 303, Fire Protection Standards for Marinas and Boatyards; NFPA 302, Fire Protection Standards for Pleasure and Commercial Motor Craft; NFPA 30A, Automotive and Marine Service Station Code; NFPA 307, Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves; and NFPA 33, Standard for Spray Application Using Flammable and Combustible Materials.
- ✧ Be sure hydrants are available to allow for fighting fires throughout your facility. (This can include dry hydrants.)
- ✧ Install smoke detectors.
- ✧ Provide and maintain adequate, readily accessible, and clearly marked fire extinguishers throughout the marina, especially near fueling stations.
- ✧ Inspect and test all fire fighting equipment and systems regularly. Test fire extinguishers annually.
- ✧ Train personnel on fire safety and response: who to call, location of hydrants, use of portable extinguishers, etc.
- ✧ Provide ready access to all piers, floats, and wharves for municipal fire fighting equipment.
- ✧ Invite the local fire marshal to visit your marina annually to train employees. These annual visits will also help the fire department to become familiar with your facility.

Emergency Response Equipment

- ✧ Obtain and store emergency response equipment in an easily accessible location and where the greatest threat of an emergency exists (i.e., oil spill kit on the fuel dock).

Boat Maintenance

- ✧ Provide an oil boom for boaters who are working on their boats in the water.

Share Your Emergency Response Plans

- ✧ Inform your local fire department and harbor master, if applicable, about your emergency response plans and equipment.
- ✧ Let neighboring marinas know what resources are available at your marina.

Petroleum Control

Environmental Concern

Petroleum products introduced in the environment are a chronic problem. Small incremental discharges of petroleum products add up to significant impacts, especially to important commercial and sport fish and wildlife. Accidental releases may occur during fueling, bilge pumping, and maintenance. Intentional releases may occur when a boater/contractor/employee does not know of the proper place to dispose of waste petroleum.

Goal

Prevent accidental or intentional release of petroleum products into the environment.

Legal Setting

Federal

Environmental Protection Agency's (EPA) Spill Prevention, Control, and Countermeasure (SPCC) Program:

- The EPA's SPCC regulations apply to facilities which have:
 - an above ground oil storage capacity greater than 660 gallons in a single container;
 - an aggregate above ground storage capacity greater than 1,320 gallons; or
 - a total underground storage capacity greater than 42,000 gallons.
- Oil is defined in the SPCC regulations as "oil of any kind or in any form, including but not limited to petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil and oily mixtures."
- SPCC requires the preparation and implementation of a plan to prevent any discharge of oils to waters or shorelines.
- The plan must address:
 - operating procedures implemented by the facility to prevent oil spills;
 - control measures installed to prevent a spill from entering navigable waters or adjoining shorelines; and
 - countermeasures to contain, cleanup, and mitigate the effects of an oil spill that impacts navigable waters or adjoining shorelines.
- The SPCC plan must be certified by a professional engineer and kept on site for EPA to review. If a single spill of greater than 1,000 gallons occurs or two discharges of harmful quantity occur within one year, a copy of the SPCC plan must be submitted to EPA Region III. The SPCC plan must be updated every three years or when there is a change.

Federal Water Pollution Control Act

- The Federal Water Pollution Control Act, commonly known as the Clean Water Act, addresses many facets of water quality protection. This law, particularly parts known as the Oil Protection Act of 1990 (OPA 90), specifically prohibits the discharge of oil or hazardous substances into U.S. navigable waters. It also prohibits the use of chemical agents like soaps, detergents, surfactants, or emulsifying agents to disperse fuel, oil, or other chemicals without permission of the U.S. Coast Guard. Among the many regulations which are derived from the Act, 33 CFR parts 154 and 156 apply to waterside facilities whose storage capacity is greater than 250 bbls (10,500 gallons) or which transfer fuel to vessels which have storage capacity greater than 250 bbls (10,500 gallons). These regulations, administered by the US Coast Guard, contain a number of equipment and operational requirements such as development of an operations manual, providing proper lighting of transfer areas, two-way communications between the vessel and the facility operator, emergency shutdowns, ability to clean up a discharge, etc.

State

It is illegal for anyone to pollute the waterways in Virginia.

Underground Storage Tanks:

Underground storage tanks (USTs) are regulated under Subtitle I of the 1984 amendment to the federal Resource Conservation and Recovery Act and under similar provisions contained in Virginia State Water Control Law, §§62.1-44.34:8 et seq (Article 9), and its derivative regulations, 9 VAC 25-580-10 et seq. The regulations also require tank owners to register their USTs with DEQ and to maintain evidence of their financial ability to conduct up to \$1 million of cleanup should the tank(s) leak. Installation, upgrades, and closure of tanks and piping must be permitted and inspected by local code officials (building/fire); DEQ simply requires tank owners to retain documentation to show that the necessary local building permits were obtained for those activities. However, DEQ does periodically inspect UST facilities to ensure compliance with the standards for day-to-day tank operation.

If a UST is found to be leaking, the owner must take immediate action to limit damage to the environment, report the leak to DEQ, and develop and carry out a plan of remediation for the site.

Aboveground Storage Tanks:

The Code of Virginia requires an operator of a facility located within the Commonwealth with a aggregate aboveground storage capacity of more than 1,320 gallons of oil or an operator of an individual AST located within the Commonwealth with a storage capacity of more than 660 gallons of oil to register such a facility or aboveground storage tank (AST) with the DEQ and with the local director or coordinator of emergency services unless otherwise specified.

Tanks of 660 gallons or more are required to be registered with DEQ. In addition, for facilities with an aggregate capacity of 25,000 gallons or

*"It is illegal
for anyone to
pollute the
waterways in
Virginia."*

more, the regulations also require pollution prevention measures including inventory control procedures/equipment, secondary containment, leak detection, periodic formal integrity assessments and regular visual inspections, record keeping, and staff training. The regulations also require the preparation and maintenance of an Oil Discharge Contingency Plan.

Best Management Practices

Protect Petroleum Storage Tanks

- ✦ Install double-walled or vaulted fuel tanks with aboveground piping. Tanks should meet the following conditions (NFPA 30):
 - The capacity of the tank shall not exceed 12,000 gal (45,420 L).
 - All piping connections to the tank shall be made above the normal maximum liquid level.
 - Means shall be provided to prevent the release of liquid from the tank by siphon flow.
 - Means shall be provided for determining the level of the liquid in the tank. This means shall be accessible to the delivery operator.
 - Means shall be provided to prevent overfilling by sounding an alarm when the liquid level in the tank reaches 90 percent of capacity and by automatically stopping delivery of liquid to the tank when the liquid level in the tank reaches 95 percent of capacity. In no case shall these provisions restrict or interfere with the proper functioning of the normal or emergency vent.
 - Spacing between adjacent tanks shall be not less than 3 feet (0.9 m).
 - The tank shall be capable of resisting the damage from impact of a motor vehicle or suitable collision barriers shall be provided.
 - Where the interstitial space is enclosed, it shall be provided with emergency venting.
 - Locate above ground fuel tanks within a dike or over an impervious storage area with containment volumes equal to 1.1 times the capacity of the storage tank (s).
 - Design containment areas with spigots to drain collected materials.
 - If possible, cover the tank with a roof to prevent rainwater from filling the containment area.
 - Inspect tanks and piping regularly.

Avoid Waves and Wakes

- ✦ Locate fuel docks in protected areas. For safety reasons, all fueling stations should be accessible by boat without entering or passing through the main berthing area.

Legally Required ■

Highly
Recommended ✦
BMPs

Suggested BMPs ◇

- ✦ Provide a stable platform for fueling personal watercraft (PWC):
 - Prefabricated drive-on docks.
 - Modify an existing dock by cutting a v-shaped berth and covering it with outdoor carpeting.
 - Place the PWC fueling area at the end of the fuel pier to reduce conflict with larger boats.

Maintain Fuel Transfer Equipment

- ✦ Inspect and maintain transfer equipment and hoses in good working order. Replace hoses, pipes, and tanks before they leak.
- ✦ Hard connect delivery nozzles.
- ✦ Hang nozzles vertically when not in use so that fuel remaining in hoses does not drain out.

Install Environmental Controls at the Pump

- Consider installing Stage II Vapor recovery on gasoline systems (required only in non-attainment or potential non-attainment areas such as Northern Virginia and Hampton Roads).
- ✦ Do not install holding clips for gas nozzles.
- ✦ Install automatic back pressure shut-off nozzles on fuel pump discharge hoses to automatically stop the flow of fuel into a boat's fuel tank when sufficient reverse pressure is created.
- ✦ Maintain a supply of clearly marked, easily accessible oil absorbent pads and pillows at the fuel dock to mop up spills on the dock and on the water.
- ✦ Place plastic or nonferrous drip trays lined with oil absorbent material beneath fuel connections at the dock to prevent fuel leaks from reaching the water.
- ✦ Post instructions at the fuel dock directing staff and patrons to immediately remove spilled fuel from the dock and water with oil absorbent material. Indicate the location of the absorbents.
- ✦ Install breakaway fittings to prevent drive-offs or accidental/violent disconnects.
- ◇ Consider installing fuel nozzles that redirect blow-back into vessels' fuel tanks or vapor control nozzles to capture fumes.
- ◇ Place small gas cans in oil-absorbent lined drip pans when filling.
- ◇ Secure oil-absorbent material at the waterline of fuel docks to quickly capture small spills. Look for oil-absorbent booms that are sturdy enough to stand up to regular contact with the dock and boats.
- ◇ Offer your services to install fuel/air separators on boats.

Supervise Fueling: Environmental Recommendations

- ✦ Always have a trained employee at the fuel dock to oversee or assist with fueling.
- ✦ Train employees to clarify what the boater is asking for. For example, as your employee passes the fuel nozzle to the boater, have him or her say, "This is gasoline. You asked for gasoline."
- ✦ Attach a container to the external vent fitting to collect overflow. There are products on the market that may be attached to the hull with suction cups. A rubber seal on the container fits over the fuel

■ Legally Required

✦ Highly
Recommended
BMPs

◇ Suggested BMPs

vent allowing the overflow to enter the container. Fuel captured in this manner can be added to the next boat to fuel.

- ★ Require boaters to stay with their craft during fueling.
- ◇ Instruct fuel dock personnel and boaters to listen to filler pipes to anticipate when tanks are nearly full.
- ◇ Encourage boaters to fill their fuel tanks just before leaving on a trip to reduce spillage due to thermal expansion and rocking. If the fuel is used before it warms up, it cannot spill overboard.
- ◇ If boaters prefer to refuel upon their return to port, encourage them to fill to 90 percent of capacity.
- ◇ Instruct boaters to slow down at the beginning and end of fueling.
- ◇ Train employees to hand boaters absorbent pads with the fuel nozzles. Request that the boaters use them to capture backsplash and vent line overflow.

Supervise Fueling: Safety Recommendations

- ★ Always have a trained employee at the fuel dock to oversee or assist with fueling.
- ★ Remind boaters that gasoline vapors are heavier than air; they will settle in a boat's lower areas.
- ★ Require all passengers to get off gasoline powered vessels before fueling.
- ★ Turn down the pressure on the fuel dispenser. Problems with backsplash and vent-line overflow are often due to the high pressure flow of fuel from the pump.
- ★ Ask your fuel company representative to reduce the pressure to a delivery rate of 10 gallons per minute -especially if you cater to small boats - or use a lower pressure sub-unit to lower pressure.
- ◇ Instruct boaters to:
 - Stop all engines and auxiliaries;
 - Shut off all electricity, open flames, and heat sources;
 - Extinguish all cigarettes, cigars, and pipes;
 - Close all doors, hatches, and ports;
 - Maintain nozzle contact with the fill pipe to prevent static spark;
 - Inspect bilge after fueling for leakage or fuel odors; and
 - Ventilate all compartments after fueling until fumes are gone
- ◇ Train dock staff to carefully observe fueling practices; make sure fuel is not accidentally put in the holding tank, the water tank, or a rod holder.

Advocate the Use of Oil-absorbent Materials

- ◇ Distribute pads, pillows, or booms to your tenants.
- ◇ Require tenants to use oil-absorbent materials as part of your lease agreement.

Provide an Oil/Water Separator

- ◇ Invest in a portable or stationary oil/water separator to draw contaminated water from bilges, capture hydrocarbons in a filter, and discharge clean water.

Offer Spill-proof Oil Changes

- ★ Purchase a non-spill pump system to draw crankcase oils out through the dipstick tube. Use the system in the boat shop and rent it to boaters who perform their own oil changes.
- ★ Slip a plastic bag over used oil filters prior to their removal to capture any drips. Hot drain the filter by punching a hole in the dome end and draining for 24 hours. Recycle the oil and the metal canister or dispose of it in the regular trash if recycling is not practical.

Oil-absorbent Material

Oil-absorbent pads, booms, and pillows absorb hydrocarbons and repel water. Depending upon the type, they may hold up to 25 times their weight in oil. These types of products are useful for capturing spurts at the fuel dock, cleansing bilge water, and wiping up spills in engine maintenance areas.

There are a number of new twists on basic oil-absorbent materials. One new variety of oil-absorbent boom captures oil from the bilge and solidifies into a hard rubber bumper. Other types contain microbes that digest the petroleum. The oil is converted to carbon dioxide and water. Because the microbes take 2 to 3 weeks to digest a given input of oil, it is not appropriate to use these types of products for a spill of any significant size. Rather, they are designed to control the minor drips associated with routine operations. Care must still be taken that free-floating oil is not discharged overboard.

Yet another type of oil-absorbent product is a boom constructed out of oil-absorbent polypropylene fabric and filled with dehydrated microbes. These booms hold the petroleum in the fabric until it is digested by microbes. Threats associated with free-floating petroleum are thereby minimized.

How you dispose of used oil-absorbent material depends on what type of product it is and how it was used:

- Standard absorbents that are saturated with gasoline may be air dried and reused.
- Standard absorbents saturated with oil or diesel may be wrung out over oil recycling bins (if they are saturated with oil and diesel only!) and reused. Alternatively, they should be double bagged - one plastic bag sealed inside of another - and tossed in your regular trash.
- Bioremediating bilge booms may be disposed in your regular trash as long as they are not dripping any liquid. Because microbes need oxygen to function, do not seal them in plastic bags.

■ Legally Required

★ Highly
Recommended
BMPs

◇ Suggested BMPs

Information Sources

National Fire Protection Association

United States Coast Guard

United States Coast Guard Auxiliary-District 5sr

US Environmental Protection Agency

Virginia Department of Environmental Quality

OSHA-VOSH REGION 3

Local Fire and Rescue Departments

Department of Emergency Management

Education

Provide Information on Recycling Programs for Petroleum Wastes.

Use Signs, Mailings, etc.

Amend Contracts to Include BMPs.

- ◇ Encourage the use of spill-proof oil change equipment as a condition of your slip rental agreement.

Minimize Spills and Leaks from Machinery

- ✦ Use non-water-soluble grease on travelifts, forklifts, cranes, and winches.
- ✦ Place containment berms with containment volumes equal to 1.1 times the capacity of the fuel tank around fixed pieces of machinery that use oil and gas.
- ✦ Design containment areas with spigots to drain collected materials and dispose of all collected material appropriately.
- ✦ Place leak-proof drip pans beneath machinery. Empty the pans regularly, being conscientious to dispose of the material properly (uncontaminated oil and antifreeze may be recycled).
- ◇ Place oil-absorbent pads under machinery.
- ◇ Place machinery on an impervious pad.
- ◇ If possible, cover the machinery with a roof to prevent rainwater from filling the containment area.

Educate Boaters, Staff, and Contractors

- ✦ Provide accessible emergency contact numbers for spills.
- ◇ Develop a “panic file” as described in the Emergency Planning chapter.
- ◇ Distribute fact sheets.

Bilgewater

- ◇ Minimize contaminated bilgewater discharges by offering free bilge pumpouts.
- ◇ Educate boaters about bilgewater issues.

Installation of a pumpout system may be required as a condition of receiving a wetlands permit from the Virginia Marine Resources Commission.

Sewage and Gray Water

Environmental Concern

Sewage: overboard discharges of domestic sewage from marine heads, portable toilets, and holding tanks contribute significantly to water quality degradation and introduce dangerous pathogens into the water. Poorly maintained shore facilities, pumpouts, and waste dump receptacles limit their use and discourage the proper disposal of sanitary wastes.

Gray water: gray water is defined as waste water from sinks and showers. Direct discharges of gray water increases Biological Oxygen Demand (BOD) and nutrients in the water, lowers dissolved oxygen, and contributes to undesirable algal blooms.

Goal

Encourage the proper use of pumpout facilities and waste dump receptacles by boaters, particularly live-a-boards and overnightriders. Ensure that shore facilities, sewage pumpout facilities and waste dump receptacles are maintained in good operational and sanitary condition to encourage their use. Reduce the volume of gray water discharges and the concentrations of pollutants contained in gray water discharges at marinas.

Legal Setting

Federal

Marine Sanitation Devices—Federal Water Pollution Control Act of 1972

The Water Quality Act of 1987 requires the installation of marine sanitation devices (MSD) on all vessels with installed toilet systems operating on navigable waters of the United States. All MSDs must be U.S. Coast Guard approved.

State

The law states: "All marinas or other places where boats are moored shall provide the minimum number of sanitary facilities for their patrons." Refer to "Commonwealth of Virginia Sanitary Regulations for Marinas and Boat Moorings" - available from the Department of Health - for more detailed information and exemptions.

No Discharge Areas

A No Discharge Area (NDA) is an area of water that requires greater environmental protection where even treated sewage may not be discharged from a boat. When operating in a NDA, Type I and Type II systems must be secured to prevent discharge. All freshwater lakes, reservoirs, and rivers not capable of interstate vessel traffic are defined by the federal Clean Water Act as NDAs, but they require an enforceable regulation to make them effective (Smith Mountain Lake has an enforceable regulation). States may establish NDAs in any waters with approval from the US EPA.

Discharge of untreated sewage is prohibited in all Virginia freshwater areas, the Chesapeake Bay and its tributaries, and within 12 miles of any Virginia shoreline.

Best Management Practices

Sewage pumpouts and waste dump receptacles

■ Install a pumpout/waste dump receptacle

Help boaters to meet the requirements of the law by providing a convenient, reliable marine sewage disposal facility, i.e., a pumpout station. You, as a marina operator, may benefit from the installation of a pumpout in several ways. The presence of the pumpout facility promotes a public perception that you are environmentally responsible. More tangibly, the need for holding tanks to be pumped out regularly will draw a steady stream of customers to your dock. Each arriving vessel represents an opportunity to sell fuel, hardware, repair services, etc.

Any public or private marina in Virginia is eligible to recover 75% of the cost of installing a pumpout through the Clean Vessel Act (CVA) Grant Program run by the Virginia Department of Health. To find out more or to apply for a grant, contact the Virginia Department of Health. Please be aware that the grants are strictly reimbursable. You must pay for the equipment and installation up front. The department will then reimburse you for pre-approved expenses.

Refer to the “Virginia Sanitary Regulations For Marina and Boat Moorings” for guidelines when planning a system:

■ Dispose of Collected Wastes

The best option for disposing of the collected waste is to connect directly to a public sewer. If sewer is not available in your area, you will need a holding tank or your own sewage treatment plant (expensive). The contents of the tank must be pumped periodically and trucked to a treatment plant. Holding tank size and location is determined by the local health department:

- Direct connect to a public sewer line;
- Personal sewage treatment plant; or
- Holding tank.

★ Select an appropriate system

Select a system that best meets the needs of your clients and that can move the expected volume of sewage over the required distance. Ask the manufacturer for a written assurance that their system will operate effectively given the specific conditions at your marina.

There are several types of pumpout systems available:

- permanently fixed to a dock;

■ Legally Required

★ Highly Recommended BMPs

◇ Suggested BMPs

- mobile, hand truck or boat; or
- direct slipside connections.

VDH will review your plan to assure the pumpout system is adequate.

✦ Choose an Accessible Location

Consider where the pumpout will be placed (if you select a fixed system). It should easily accommodate the types of boats that frequent your marina. Fuel docks are often good locations. Try to locate the pumpout system such that a vessel being pumped out does not prevent another boat from fueling:

- Fuel docks;
- T-heads; or
- Separate dock or bulkhead.

✦ Post signs

- Provide information on location, cost, hours of operation, where to call for service, and where to get tokens (if a token system is used).
- Post signs that are visible from the channel so passing boaters are aware of the facility.
- VDH will provide proper signage for no charge.
- If you do not yet have a pumpout, post signs directing boaters to the nearest facility.

◇ Plan Operation

Decide if the pumpout will be staffed or token-(self-service) operated. It is a good idea to have an attendant operate the pumpout. Consider installing a buzzer or paging system so that boaters at the pumpout station can easily locate the attendant. If the station is unattended, be sure clear instructions are posted.

◇ Decide on fee

- How much?
- Will tenants and liveaboards be charged?
- Will transients be charged?
- Token-operated systems have been successful in many locations.
- If you use a CVA grant, no more than \$5 per pumpout may be charged to pump a normal size holding tank.
- Consider providing a free pumpout with a fuel fillup.

◇ Apply for CVA Grant

- Contact the Virginia Health Department.
- The grant covers 75% of the cost of installing a pumpout.
- Certain restrictions apply.

◇ Maintain the pumpout

- Inspect regularly and keep a log.
- Contact the pumpout manufacturer for specific maintenance and winterization recommendations.
- Test the efficiency weekly during the boating season by measuring the length of time required for the system to empty a 5-gallon bucket of water.
- In order to quickly address any malfunctions, establish a maintenance agreement with a qualified contractor.

◇ Train staff to use the machine

If boaters are going to use the pumpout system, the experience must be as pleasant and convenient as possible. As the manager of a marina with a pumpout, you are demonstrating your commitment to clean water. It is imperative that your staff exhibit this same level of care.

- Do not allow waste to drain into receiving waters. Keep pump running until it has been re-primed with clean water.
- Make sure staff are courteous to patrons.

Shoreside Restrooms

- Provide Ample Shoreside Restrooms as defined in “Virginia Sanitary Regulations for Marinas and Boat Moorings.”
- ★ Provide clean, functional restrooms with showers to encourage people not to use their heads while in port.
- ★ Make restrooms available 24 hours a day.
- ◇ Install a security system on restroom doors so people will feel safe using them, particularly late at night.
- ◇ Provide air conditioning and heating.

Prohibit Discharge of Waste Water from Vessels - Effluent from legal Type I and Type II systems contain nutrients, possibly toxic chemicals, and probably pathogens as well. While many pass-through systems are capable of treating sewage to much higher levels, recall that the standard for Type I systems is a fecal coliform bacteria count of 1,000 per 100 milliliters. Bathing beaches may be closed at levels of 200 per 1,000 milliliters. Thus, discharges from Type I and Type II systems in crowded, protected areas - such as marinas - pose a real threat to human health and water quality. Adopt the following recommendations to discourage discharge within your facility.

- Prohibit discharge of head waste in your marina as a condition of your lease agreements.
- ★ Discourage the discharge of gray water waste in your marina as a condition of your lease agreements.
- ★ Post signs prohibiting the discharge of head and gray water waste and directing people to use shoreside restrooms.
- ◇ Input ways to ensure valves on holding tanks are closed.

“Discharges from Type I and Type II systems in crowded, protected areas - such as marinas - pose a real threat to human health and water quality.”

■ Legally Required

Highly

★ Recommended BMPs

◇ Suggested BMPs

Design and Maintain Septic Systems Properly to Protect Water Quality and The Public Health (Refer to Siting chapter for more information.)

- If you have a septic system, be alert for signs of trouble: wet areas or standing water above the absorption field, toilets that run slowly or back up, and odor. Septic failures can contaminate drinking water and shellfish. The following tips will help you to avoid the health risks and nuisance associated with an overburdened system (Miller and Eubanks 1992).

- ★ Post signs in the restrooms informing patrons not to place paper towels, tissues, cigarette butts, disposable diapers, sanitary napkins or tampons in the toilets. These items can clog the sewer lines.
- ★ Provide adequate covered disposal for the above items.
- ★ Post signs in the laundry room encouraging patrons to use minimal amounts of detergents and bleaches.
- ★ Do not dump solvents such as paint thinner or pesticides down the drain and post signs prohibiting customers from doing the same.
- ★ Do not pour fats or solvents down drains.
- ★ Use small amounts of drain cleaners, household cleaners, and other similar products.
- ★ Do not compact the soil by driving or parking over the infiltration area.
- ★ Hire a licensed professional to pump the tank every 2-5 years.
- ◇ Do not use a garbage disposal. This increases the amount of solids entering the system. Capacity is reached more quickly. As a result, more frequent pumping is necessary.
- ◇ Direct downspouts and runoff away from the septic field in order to avoid saturating the area. For stormwater management reasons, do not direct the flow toward paved areas.

Provide Facilities for Live-a-boards - Boaters who make their homes aboard vessels pose a tricky problem. It is not reasonable to expect that they will regularly untie in order to use a fixed pumpout facility. It is also unwise to assume that people living on their boats will always use shoreside restrooms (though the cleaner the shoreside facilities, the more use they will get). Furthermore, it is undesirable to allow a resident population to discharge Type I or II systems. Your obligation as a marina owner/manager is to provide a convenient sewage disposal system for liveaboards while maintaining good water quality. Consider the following options to meet this challenge. Keep in mind that most liveaboards expect and are willing to pay a premium for extra service and more convenient slips.

- ★ Provide a portable pumpout system.
- ★ Consider a lease in which vessels used as homes may not discharge any sewage.
- ★ Reserve slips closest to shoreside restrooms for liveaboards. Provide adequate lighting to and from and in the restrooms.
- ◇ Offer to board their vessels and demonstrate the proper way to secure the "Y" valve.
- ◇ Install direct sewer hookups for liveaboards.

Offer MSD Inspections

- ★ Service patrons' MSDs annually to ensure that their Type I or Type II systems are functioning properly.
- ◇ Ensure each boat's "y" valve is locked closed while in port.
- ◇ Encourage boaters to use the Type III systems when berthed.

Educate Boaters - As the generators and conveyors of sewage, boaters need to be educated about the impacts of sewage and its proper disposal. They must also be encouraged to properly maintain their MSDs and to purchase environmentally friendly treatment products for their heads and holding tanks.

- ★ Include information about MSD requirements and sewage laws in contracts for all slip renters.
- ★ Let boaters know that discharge of raw sewage is illegal and will be reported to the proper authorities. (Find out who the proper authority is in your area.)
- ★ Provide a copy of the Clean Boating Tip Sheet at the end of this chapter to tenants. Put your marina's logo and name on the sheet.
- ◇ Use the following ways of educating boaters:
 - "Sanitary Regulations for Marinas and Boat Moorings" - Virginia Department of Health
 - Pamphlets and Flyers
 - Newsletters
 - Inserts
 - Meetings
 - Inspections
 - Slip Leasing Agreement

Gray water

- ★ Reduce the Volume of Gray Water.
 - Encourage the use of shoreside showers and laundry.
 - Encourage boaters to conserve water and use water saving devices such as low volume showerheads.
- ★ Provide Gray Water Pumpouts.

"Encourage boaters to use shoreside restrooms when they are in port."

Information Sources

American Boat and Yacht Council

Virginia Department of Health, Division of Wastewater Engineering

Virginia Institute of Marine Science, Marina Technical Advisory Program

US Coast Guard

US Coast Guard Auxiliary

■ Legally Required

★ Highly Recommended BMPs

◇ Suggested BMPs

"Within the Chesapeake and coastal bays, along rivers, and on inland lakes, the discharge of any garbage into the water is illegal."

Waste Containment and Disposal

Environmental Concern

All marinas generate some non-hazardous and hazardous waste. Non-hazardous waste can be categorized into two groups: solid waste and liquid waste. Solid waste includes fish waste and garbage. Plastics are of particular concern and must be contained. There are many well-documented instances of marine mammals, fish, turtles, and seabirds that have become entangled in or choked on plastic debris. Plastics represent a hazard to navigation, as they can snare propellers and clog engine intake systems. Solid waste is also an eyesore in the water and on shore. Fish waste poses the problem of degrading the water quality of poorly flushed marina waters. Liquid waste includes bilge water, certain cleaners, and gray water. Each of these wastes can degrade the environment and must be handled properly.

Hazardous waste is defined as waste that is ignitable, corrosive, reactive, or toxic. Hazardous waste can cause severe environmental damage if disposed of improperly.

Goal

Ensure that all wastes generated at the marina are managed and disposed of properly.

Legal Setting

Federal

The Marine Plastic Pollution Research and Control Act of 1987 (MPPRCA): MPPRCA, Title II of Public Law 100-220, restricts the overboard discharge of garbage. Its primary emphasis is on plastics; it is illegal to discharge plastic materials into any waterbody. The disposal of other types of garbage is restricted according to how far a vessel is out to sea. The important thing to remember is that within the Chesapeake and coastal bays, along rivers, and on inland lakes, the discharge of any garbage into the water is illegal. Fish parts from cleaning are an exception. However, the discharge of fish waste into poorly flushed Virginia waters is not desirable.

The law also requires that marinas be able to accept garbage from vessels that normally do business with them.

The Federal Resource Conservation and Recovery Act (RCRA) of 1976: RCRA was established to improve the collection, transportation, separation, recovery, and disposal of solid and hazardous waste.

Other Laws:

- Title 40 Code of Federal Regulation Parts 260-268 (Hazardous Waste)
- Title 40 Code of Federal Regulations Section 262.11 and Chapter 62-730, F.A.C. (Antifreeze)

- Title 40 Code of Federal Regulations 279
- International Convention for the Prevention of Pollution of Ships at Sea (MARPOL):
 - Annex I: Oil
 - Annex II: Hazardous Liquids
 - Annex III: Hazardous Substances
 - Annex IV: Sewage
 - Annex V: Plastics

State

Virginia Waste Management Act

DEQ's solid waste management program is authorized under the Virginia Waste Management Act, Sections 10.1-1400 through 10.1-1457 of the Code of Virginia. The Virginia Waste Management Board develops and enforces regulations that it deems necessary to protect public health and safety and enhance the environment.

It is illegal for anyone to pollute the waterways of Virginia.

Best Management Practices

Reduce Waste - In addition to the suggestions offered in other chapters of this guidebook, consider the following recommendations to further reduce waste. Keep in mind that less waste means lower disposal costs.

- ✳ Encourage boaters to exchange excess paints, thinners, varnishes, etc. To facilitate this type of activity, provide a bulletin board where boaters can post notices that they are seeking particular materials or have an excess of substance.
- ✳ Avoid having leftover materials by sizing up a job, evaluating what your actual needs are, and buying just enough product for the job. Encourage boaters to do the same.
- ◇ Minimize office waste: make double-sided copies; use scrap paper for notes and messages; purchase recycled office paper; and reuse polystyrene peanuts or give them to companies that will reuse them, i.e., small scale packing and shipping companies.
- ◇ Request alternative packing material from vendors, i.e., paper, potato starch peanuts, popcorn, etc.
- ◇ Discourage the use of plastic and styrofoam cups, food containers, utensils, and other non-biodegradable products.
- ◇ Post the names of local schools, churches, volunteer home renovation groups, theater groups, and others, that are willing to accept excess, non-toxic paints.

Non-Hazardous Waste

Solid Waste - Solid waste, better known as trash, is unsightly, odorous, and unsanitary. It can also harm humans and wildlife and attract rodents. A clean marina, like most clean businesses, is more likely to have repeat customers than a dirty marina.

■ Legally Required

✳ Highly
Recommended
BMPs

◇ Suggested BMPs

- Accept garbage from vessels that normally do business with them.
- Putrescible waste – food that rots – can be stored for a maximum of 7 days before a permit is required.
- ★ Provide accessible, well-marked, well-lit and lidded trash receptacles. Empty and clean the receptacles at least weekly.
- ★ Select containers that are large enough to hold the expected volume of trash. On average, 4 to 6 gallons of reception capacity is needed per person per vessel per day. A cubic yard of dumpster space holds 216 gallons of trash.
- ★ Provide accessible, well-marked, well-lit and lidded recycling containers. Make the containers look different than the trash receptacles.
- ★ Contact a waste hauler or your local solid waste recycling coordinator (refer to Appendix VI) to learn what materials are collected in your area.
- ★ Post information about local recycling services if you are not able to provide all of the desired services at your facility.
- ★ Do not place trashcans or recycling containers on docks, as waste may inadvertently blow into the water. Also, training boaters to bring their own trash to a central garbage area means less work for you and your staff.
- ★ Require all employees to be involved in policing the facility for trash and vessel maintenance wastes. Do not allow litter to collect on your grounds or near shore areas.
- ★ Use flip top containers—people cannot forget to close them.
- ◇ Use a pool skimmer or crab net to collect floating debris that collects along bulkheads or elsewhere within your marina.
- ◇ Plant or construct a windscreen around the dumpster to make the area more attractive and to prevent trash from blowing away. Use native shrubs.

Liquid Waste – See Recycle Liquid Wastes (next page) for information on hazardous liquid wastes.

- Provide pumpouts for bilge water, gray water, and sewage. (See Sewage chapter.)
- Bulk containers of free liquids (as opposed to solid wastes) cannot be disposed of in a landfill.
- ★ Provide onshore disposal sites for liquid cleaners and their containers.
- ★ Post signs educating boaters on gray water discharges and boat cleaners.

Fish Waste – When large amounts of fish guts are deposited in an enclosed area, the resultant, unsightly mess can produce foul odors and impair water quality (through decreased dissolved oxygen and increased bacteria levels).

- ★ Provide facilities for fish cleaning and carcass disposal.
 - Provide a stainless steel sink equipped with a garbage disposal that is connected to a sanitary sewer. (Note: fish heads, large carcasses, and fish skin will clog up the disposal.)
 - Provide garbage containers for fish carcasses.
 - Empty garbage containers regularly (especially on hot days).
 - Prohibit fish cleaning outside of designated areas.
- ★ Implement fish composting where appropriate. Contact Minnesota Sea Grant for a copy of *Composting Fish Waste* by Thomas Halbach and Dale Baker. (Cost \$2 in 2000). This booklet provides instructions for composting 25 five-gallon buckets of fish waste per week using sphagnum peat moss and wood chips.
- ★ Use a grinder to make chum out of fish carcasses. Sell the chum at your marina store.
- ★ Arrange for crabbers to take fish carcasses.
- ◇ Prohibit fish cleaning at your marina.
- ◇ Educate people on the water quality problems associated with excess fish waste in marina waters.

"Provide facilities for fish cleaning and carcass disposal"

Hazardous Waste - Hazardous Waste Generators are those individuals or companies that produce greater than 100 kilograms (about 220 pounds or 30 gallons) of hazardous waste during one calendar month or who store more than 100 kilograms at any one time.

"Conditionally Exempt Small Quantity Generators" are facilities that generate less than 100 kilograms of hazardous waste per month and do not accumulate more than 1000 kilograms of waste at any one time. Conditionally Exempt Small Quantity Generators are not required to register with the EPA. All hazardous waste should be sent to a disposal facility that is permitted, licensed, or registered by the state to dispose of hazardous waste.

How Do You Know if a Substance is Hazardous?

- All waste generators must determine whether or not their refuse is hazardous.

The waste is hazardous if it exhibits one or more of the characteristics of hazardous materials: ignitability, corrosivity, reactivity, or toxicity. A generator may either have the waste tested to determine if it exhibits a hazardous characteristic or use knowledge of the waste, i.e., first hand experience or information gathering from a Material Safety Data Sheet. The test for toxicity is called the Toxicity Characteristic Leaching Procedure (TCLP) and is performed by industrial laboratories.

■ Legally Required

★ Highly Recommended BMPs

◇ Suggested BMPs

"Do not allow patrons to pour gasoline, solvents, paint, varnishes, or pesticides into the oil or antifreeze recycling containers"

Recycle Liquid Wastes

- DO NOT ALLOW PATRONS TO POUR GASOLINE, SOLVENTS, PAINT, VARNISHES, OR PESTICIDES INTO THE OIL OR ANTIFREEZE RECYCLING CONTAINERS. The introduction of these materials creates a "hazardous waste." The whole tank must be disposed of as hazardous waste: a very expensive undertaking.
- ★ Provide separate containers to collect oil and antifreeze. Also, collect solvents from your boatyard according to hazardous waste regulations.
- ★ Provide separate containers for oil, antifreeze, and solvents.
- ★ Surround tanks with impervious, secondary containment that is capable of holding 110 percent of the volume of each tank.
- ★ Try to shelter tanks from the elements.
- ★ Attach funnels to tanks to reduce chances of spills. Funnels should be large enough to drain portable containers and oil filters. Use funnels with locking lids that screw into the bungs of 55-gallon drums.
- ★ Post signs indicating what may and may not be placed in each tank.
- ◇ Check with your recycler to learn what materials may be mixed. Generally speaking, engine oil, transmission fluid, hydraulic fluid, and gear oil may all be placed in a waste oil container. Some haulers will also take diesel and kerosene. Ethylene glycol and propylene glycol antifreeze are often collected in the same used antifreeze tank. As a precaution though, CHECK WITH YOUR RECYCLER BEFORE MIXING ANY MATERIALS.
- ◇ Consider locking all the intake to oil and antifreeze recycling containers to prevent contamination. If you do lock the tanks, instruct your patrons to get the key from the appropriate staff person or to leave their oil or antifreeze next to the collection tank. If you select the second option, assign a member of your staff to inspect the collection site daily for any material that may have been dropped off.
- ◇ Be aware that recycling liquid materials is a long-term obligation. Investigate waste haulers to insure that they actually recycle the collected material. Maintain shipping manifests for solvents and other hazardous wastes for a minimum of 3 years (manifests are not required for used oil and antifreeze that is being recycled).

Management-marinas

- Dispose of hazardous wastes properly.
- ★ Minimize the use of hazardous products to reduce health and safety risks to your staff, tenants and contractors; lower disposal costs; decrease liability; and limit chances that you will be liable for costly clean-up of inappropriately disposed material.

- ★ Do not store large amounts of hazardous materials. Purchase these materials in quantities that you will use up quickly.
- ★ Establish a “first-in first-out” policy to reduce storage time. Dispose of excess material every 6 months.
- ★ Label wastes properly, especially when different types of wastes are stored in the same area.
- ◇ Avoid using, to the greatest extent possible, products that are corrosive, reactive, toxic, or ignitable.
- ◇ Adopt an inventory control plan to minimize the amount of hazardous material you purchase, store, and dispose.

Management-patrons - Waste from private boaters doing work on their own boats is considered “household waste” under RCRA, and therefore is exempted from regulation as hazardous waste. However, it is in the best interest of the marina to manage chemical wastes from patrons to ensure the wastes do not end up causing the marina a regulatory/environmental issue in the future.

- ★ Provide convenient, well marked disposal sites.
- ★ Put language in contract requiring proper disposal.
- ★ Post signs by solid waste receptacles that prohibit disposal of hazardous waste.
- ◇ Stencil storm drains to indicate where the drain discharges (i.e., Chesapeake Bay). Patrons might be less likely to dump if they realize that their favorite fishing water may become contaminated.
- ◇ If your marina does not collect and dispose of hazardous waste on site, direct marina patrons about proper disposal of hazardous waste.
- ◇ Use signs, mailings, postings on bulletin boards, etc. Post collection center locations near the waste receptacles.

Storage

- Store solvents and other hazardous materials in closed, fire-safe containers that are UL listed or Factory Mutual approved. Containers must meet U.S. Department of Transportation standards for protecting against the risks to life and property inherent in the transportation of hazardous materials. Approved containers will carry specification markings (i.e., DOT 4B240ET) in an unobstructed area. Refer to 49 CFR 178 for additional packaging specifications.
- Plainly label all stored and containerized material. Mark the date accumulation begins and ends. UNLESS YOU ARE A CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR, THE REQUIREMENTS ARE MORE STRICT. You will need to designate Satellite Accumulation Areas and/or Accumulation Areas; containers must be labeled as “Hazardous Waste” and only the container full date needs to be on the drum.

■ Legally Required

★ Highly
Recommended
BMPs

◇ Suggested BMPs

- Store containers on pallets in a protected, secure location away from drains and sources of ignition. Routinely inspect the storage area for leaks. Generators must inspect their containers weekly and document the inspections.
- Please remember that if you are a Conditionally Exempt Small Quantity Generator, your waste is STILL hazardous waste and may not be disposed of on the ground, in the water, or through a landfill or other solid waste disposal method (i.e., trash can).
- ✦ Assign control of hazardous supplies to a limited number of people who have been trained to handle hazardous materials and understand the first-in, first-out policy.
- ✦ Routinely check the date of the materials to prevent them from outliving their shelf life.

Follow Recommended Disposal Methods - The following table contains information about recommendations for the proper disposal of wastes typically found at marinas. Refer to Appendix VI for a list of recyclers.

Waste Disposal Options -targeted for commercial operators (households have different laws)

WASTE	DISPOSAL OPTIONS If multiple options are listed, the first option (*) is the preferred method
Antifreeze <ul style="list-style-type: none"> • Propylene glycol • Ethylene glycol Contact your waste hauler to confirm that they will accept mixed antifreeze.	*Recycle <ul style="list-style-type: none"> • Hire a waste hauler to collect and dispose. • Purchase an on-site recovery unit. Distillation systems are more expensive than filtration systems but are more efficient at renewing used antifreeze.
Waste Oil <ul style="list-style-type: none"> • Engine oil • Transmission fluid • Hydraulic oil • Gear oil • #2 Diesel • Kerosene Contact your waste hauler to confirm that they will accept mixed oil.	*Recycle with a licensed waste management contractor. <ul style="list-style-type: none"> • Use waste oil for space heating. • Take small quantities to a household hazardous waste collection program. (Not legal for businesses) Locations: Hanover, Henrico, Fairfax, SPSA, Chesterfield.
Quart Oil Cans	*Drain completely and dispose in regular trash. They cannot be recycled.
Non-terne plated Oil Filters	*Puncture and completely hot drain for at least 24 hours. Recycle the oil and the metal canister. <ul style="list-style-type: none"> • If you do not recycle the canister, double-bag it in plastic and place it in your regular trash.

WASTE	DISPOSAL OPTIONS
Terne plated Oil Filter (used in heavy equipment and heavy-duty trucks)	Dispose of as hazardous waste (contains lead).
Stale Gasoline	*Add stabilizer in winter to prevent gasoline from becoming stale, or add octane booster in the spring to rejuvenate. Use the fuel. <ul style="list-style-type: none"> • Mix with fresh fuel and use. • Hire a hazardous waste hauler to collect and dispose of it.
Kerosene	Filter and reuse for as long as possible, then recycle.
Mineral Spirits	Filter and reuse. (DO NOT add to used oil to be burned in space heaters.)
Solvents <ul style="list-style-type: none"> • Paint and engine cleaners such as acetone and methylene chloride 	*Reuse as long as possible and then recycle. <ul style="list-style-type: none"> • Use less toxic alternatives to avoid disposal issues. • Dispose of as hazardous waste. (DO NOT add to used oil to be burned in space heaters.)
Sludge Recovered from a Hazardous Solvent	Dispose of as hazardous waste.
Sludge Recovered from a Non-hazardous Solvent	*Let sludge dry in a well-ventilated area, wrap in newspaper, and dispose of in garbage.
Paints and Varnishes <ul style="list-style-type: none"> • Latex • Water-based • Oil-based 	Water Based: <ul style="list-style-type: none"> • Allow to dry completely. Dispose of in regular trash. Oil/Solvent Based: <ul style="list-style-type: none"> • Dispose of as hazardous waste. Water Based and Oil Based: <ul style="list-style-type: none"> • Use leftover material for other projects, (i.e., as an undercoat for the next boat). • Encourage tenants to swap unused material.
Paint Brushes	Allow to dry completely prior to disposal. Treat as hazardous waste if paint contains heavy metals above regulatory levels.
Rags Soaked with Hazardous Substances	*Keep in covered container until ready to discard. Dispose of the solvent that collects in the bottom of the container as hazardous waste. <ul style="list-style-type: none"> • Wring rags out over a waste solvent collection container and have laundered by an industrial laundry. • If rags fail TCLP test, dispose of as hazardous waste.
Used Oil Absorbent Material	*If oil and diesel is adequately absorbed, double bag it in plastic and discard in trash (AS LONG AS NO PETROLEUM IS LEAKING). *If it is saturated with gasoline and is a reasonably small amount, allow it to air dry and reuse OR DOUBLE BAG AND DISPOSE IN TRASH.

WASTE

DISPOSAL OPTIONS

Used Bioremediating Bilge Booms	*Discard in regular trash as long as no liquid is dripping. Because the microbes need oxygen to function, do not seal in plastic.
Epoxy and Polyester Resins	*Catalyze and dispose of as solid waste AS LONG AS IT DRIES HARD AND HAS NO FREE LIQUIDS.
Glue and Liquid Adhesives	*Catalyze and dispose of as solid waste.
Containers <ul style="list-style-type: none"> • Paint cans • Buckets • Spent caulking tubes • Aerosol cans 	<p>Aerosol Cans: If there is residue they are hazardous wastes. If they are empty they can be recycled under the scrap metal exemption (if your scrap recycler takes them).</p> <p>All other containers or cans may be put in trash can as long as:</p> <ul style="list-style-type: none"> • All material that can be removed has been. (For example, in a 55 gallon drum, no more than 1" of residue remains on the bottom or inner liner.) • Containers that held compressed gas are at atmospheric pressure. • Containers that held acute hazardous waste have been triple rinsed with the appropriate (as listed on the container) solvent. Properly dispose of the solvent.
Residue from Sanding, Scraping, and Blasting	<p>*Document that the residue is not hazardous (does not contain metals).</p> <p>*Dispose of as solid waste.</p> <p>*If it contains metals, it is a hazardous waste and must be disposed of properly.</p>
Residue from Pressure Washing	*Dispose of as solid waste.
Lead Batteries (encourage the use of maintenance free batteries)	<p>*Recycle or sell to scrap dealers. Store on an impervious surface, under cover. Protect from freezing. Check frequently for leakage.</p> <ul style="list-style-type: none"> • Inform boaters that if they bring their old battery to a dealer, they will receive a \$5 refund on a new battery.
Expired Distress Signal Flares	<p>*Encourage boaters to keep on board as extras.</p> <ul style="list-style-type: none"> • Store in well marked, fire safe container. Use expired flares to demonstrate to boaters how they are used. Be sure to notify the Coast Guard and fire department ahead of time. • Encourage boaters to bring flares to a local fire department or household hazardous waste collection program.
Scrap Metal	<ul style="list-style-type: none"> • Recycle.

WASTE	DISPOSAL OPTIONS
Light Bulbs <ul style="list-style-type: none"> • Fluorescent bulbs • Mercury vapor lamps • High-pressure sodium vapor lamps • Low-pressure sodium vapor lamps • Metal halide lamps 	*Recycle if you have more than a few. (Virginia does not have a number guideline and encourages recycling through contractors.) <ul style="list-style-type: none"> • Treat as solid waste if you have less than one or two and they are mixed with other solid waste. If you segregate from solid waste they need to be dealt with as a hazardous or universal waste. (Use low mercury or "green tip" fluorescent bulbs)
Refrigerants	*Recycle. If you deal with AC, you must be certified and use EPA approved CFC recovery and recycling equipment. <ul style="list-style-type: none"> • Use alternative refrigerants: HCFC-22 (for ACS and electric chillers), HCFC-123 (replaces CFC-11), HFC-134A (replaces CFC-12). NOTE-do not mix refrigerant oil with used engine oil and do not mix it with engine oil to be burned in space heaters.
Monofilament Fishing Line	*Recycle through a manufacturer or tackle shop. *Dispose in sealed trash can.
Scrap Tires	*Recycle. (Legally you can't store tires without a permit-over 500 is a Class 6 felony.)
Pesticides	*Dispose of as hazardous wastes.
Plastic Shrink Wrap	*Recycle.
Fish Waste	*Prohibit disposal of fish waste into confined marina waters. *Establish a fish cleaning station and adopt one of the following disposal methods: <ul style="list-style-type: none"> • Implement fish composting where appropriate. • Use a grinder to make chum out of fish carcasses. Sell the chum at your marina store. • Arrange for crabbers to take fish carcasses.
Abandoned and Derelict Vessels	*Ensure holding tanks, fuel tanks and bilges are not leaking. *Haul out boats that are sinking/have sunk. *Contact the owner. *Obtain title to boat before attempting to dispose of vessel.

Information Sources

Center for Marine Conservation

Minnesota Sea Grant College Program

US Coast Guard

US Coast Guard Auxiliary

Virginia Department of Environmental Quality, (A General Guide to Environmental Regulations in Virginia)

Virginia Department of Health, Division of Wastewater Engineering

Virginia Institute of Marine Science, Marina Technical Advisory Program

Education

Provide recycling information

Post signs and hand out brochures to direct customers to disposal areas

Insert language in contract concerning disposal of hazardous wastes

Vessel Maintenance and Repair

Environmental Concern

Boat cleaning, engine repair, pressure washing, painting, and regular maintenance near or on the water can release oils, greases, paint chips, paint liquids, detergents, etc. If these contaminants are allowed to flow into the waterbody they can pollute the water, kill marine life, and reduce the sunlight available for aquatic plants. Toxic heavy metals, such as copper, zinc, lead and tin from bottom paints, can get into the food chain through bottom-dwelling creatures or may settle into the sediments, potentially increasing the cost of dredge spoil disposal.

Many of the cleaning products meant to be used in boat shops are also toxic. Many contain caustic or corrosive elements. They may also contain chlorine, phosphates, inorganic salts, and metals. Even non-toxic products are harmful to wildlife. For example, detergents found in many boat cleaning products will destroy the natural oils on fish gills, reducing their ability to breathe.

Goals

1. Minimize the amount of materials from vessel maintenance and repair entering the water.
2. Use less toxic alternatives where feasible for vessel maintenance and repair.

Legal Setting

Federal

Federal Water Pollution Control Act

The Federal Water Pollution Control Act, commonly known as the Clean Water Act, addresses many facets of water quality protection. It requires permits be issued for projects involving the discharge of dredged or fill material in Federal Waters and wetlands, including nontidal wetlands. In addition, it provides the authority for the National Pollutant Discharge Elimination System (NPDES) permit program for point sources of pollution. The Act prohibits the discharge of oil or hazardous substances into U.S. navigable waters. It also prohibits the use of chemical agents like soaps, detergents, surfactants, or emulsifying agents to disperse fuel, oil, or other chemicals without permission of the U.S. Coast Guard.

State

Virginia Pollutant Discharge Elimination System Regulation

A Virginia Pollutant Discharge Elimination System (VPDES) Permit is required for marinas if there are any point source discharges of process water (collected wash water for example) or storm water. VPDES Permits can be individual permits (for one facility only) or general permits (issued to a class of similar dischargers). For storm water discharges there is a General VPDES Permit that is usually

applicable to marinas. This general permit applies to storm water discharges from water transportation facilities that have vehicle (vessel) maintenance shops and/or equipment cleaning operations. The water transportation industry includes facilities engaged in foreign or domestic transport of freight or passengers in deep sea or inland waters; marine cargo handling operations; ferry operations; towing and tugboat services; and marinas (facilities commonly identified by Standard Industrial Classification (SIC) code Major Group 44). The regulation authorizing this general permit is the VPDES General Permit Regulation for Stormwater Discharges associated with Industrial Activity. It governs new and existing storm water discharges associated with industrial activity through a conveyance to surface waters or through a municipal or non-municipal separate storm sewer system to surface waters.

All VPDES permits are valid for 5 years; however, as a general permit may have been issued prior to a facility obtaining coverage, the permittee should check to see when the general permit expires.

Stormwater General Permit Regulation, 9VAC 25-151-10 et seq.

Refer to Stormwater Chapter for more information.

Best Management Practices

In the water - While working on a boat in the water is not the preferred method, it is sometimes unavoidable. To minimize the impacts follow the BMPs below:

- ✳ Educate employees/boaters/contractors of cleaning methods that prevent the release of pollutants to waters. Post signs and hand out educational materials describing boat cleaning methods.
- ✳ Prohibit pressure washing (for boats in the water).
- ✳ Avoid in-the-water hull scraping and any abrasive process that occurs underwater that may remove anti-fouling paint from the boat.
- ✳ Wash the boat hull above the waterline by hand. Detergents and cleaning compounds used for washing boats should be phosphate-free and biodegradable and amounts used should be kept to a minimum. Sell these environmentally sensitive products in your marina store.
- ✳ Discourage the use of traditional sudsing cleaners that must be rinsed off and discourage the use of detergents containing ammonia, sodium hypochlorite, chlorinated solvents, petroleum distillates or lye.
- ✳ Plug scuppers to contain dust and debris.
- ✳ Offer incentives, like reduced mid-season haul out rates, so that boaters can have their hulls cleaned on land where contaminants may be contained.
- ✳ Incorporate guidelines for boat maintenance into slip leasing agreements.
- ◇ Encourage the owner to remove the boat from the water for maintenance.

■ Legally Required

Highly
✳ Recommended
BMPs

◇ Suggested BMPs

"Vessel maintenance areas for new marinas within the Chesapeake Bay Resource Protection Area must be located outside the 100-foot buffer"

- ◇ Encourage the use of sponges or soft towels to clean the boat hull on a regular basis.
- ◇ Keep containers of cleaning and maintenance products closed.

Out of the water

- Collect all maintenance debris. Clean work areas after completing each operation or at the end of the day - whichever comes first. Segregate debris if possible and dispose of properly.
- Vessel maintenance areas for new marinas within the Chesapeake Bay Resource Protection Area must be located outside the 100-foot buffer. (Refer to the Sitings Chapter.)
- Contain and properly dispose of rinse water/paint chips from boats washed on upland areas.
- ☆ Designate work area: areas set aside for boat work are beneficial to the marina in many ways. One, the marina has a sense of order. Two, the marina staff can monitor the area for potential environmental problems. Three, the area can be located away from the water so stormwater runoff will have the maximum amount of time and distance to be filtered.
- ☆ Perform all major repairs - such as stripping, fiberglassing, and spray painting - in designated areas.
- ☆ Locate maintenance areas as far from the water as possible.
- ☆ Vessel maintenance areas should have an impervious surface (i.e. asphalt or cement) and, where practical, a roof. Sheltering the area from rain will prevent stormwater from carrying debris into surface waters.
- ☆ If asphalt or cement is not practical, perform work over filter fabric or over canvas or plastic tarps. Filter fabric will retain paint chips and other debris yet - unlike plastic, or to a lesser extent, canvas - filter fabric will allow water to pass through. Tarps may be potentially re-used multiple times.
- ☆ Use vegetative or structural controls sited in the *Stormwater Management Workbook* (obtain a copy from DCR) to treat stormwater runoff, wherever practicable. (Also see Stormwater Chapter)
- ☆ Establish a schedule for inspecting and cleaning stormwater systems. Remove paint chips, dust, sediment, and other debris. Clean oil/water separators.
- ☆ Prohibit extensive maintenance or repair work outside of the designated maintenance areas.
- ☆ Clearly mark the work area with signs, i.e., "Maintenance Area for Stripping, Fiberglassing, and Spray Painting."
- ☆ Post signs, distribute materials with slip lease agreement, have materials available at store, etc. describing best management practices that boat owners and contractors must follow, i.e., "Use Tarps to Collect Debris."
- ◇ Develop, initiate and maintain procedures for managing requests to use the workspace, to move boats to and from the site, and to insure the use of BMPs.
- ◇ Surround the maintenance area with a berm or retaining wall.

Minimize Impacts of Painting

Paints

- ★ Recommend to your customers antifouling paints containing the minimum amount of toxin necessary for the expected conditions. Sell these paints in your marina store.
- ★ Avoid soft ablative paints. (See pg. 68.)
- ★ Use water-based paints whenever practical.
- ◇ Stay informed about antifouling products, like Teflon, silicone, polyurethane, and wax that have limited negative impacts. Pass on the information to your customers.
- ◇ Store boats out of the water, where feasible, to eliminate the need for antifouling paints.

Pressure Washing

- All pollutants must be removed from wash water before it may be discharged. At a minimum, allow large particles to settle out. More thorough treatment involves filtration or chemical or physical techniques to treat the rinse water:
 - Use filtration devices such as screens, filter fabrics, oil/water separators, sand filters, and hay bales to remove particles;
 - Chemical treatment relies upon the addition of some type of catalyst to cause the heavy metals and paint solids to settle out of the water; and
 - Swirl concentrators are examples of physical structures that can be used to concentrate pollutants. They are small, compact soil separation devices with no moving parts. Water flowing into a concentrator creates a vortex that centralizes the pollutants. Clean water is then discharged.
- Discharge treated wash water to surface water if it contains no pollutants. If detergents were used, the waste water must be directed into a sewer system.
- Collect debris. Have your waste hauler characterize the waste and bring it to a facility authorized to manage municipal or industrial solid waste, provided that, if the waste is hazardous, the amount generated is less than 220 pounds per month or less than this amount is accumulated at any time.
- ★ Pressure wash over a bermed, impermeable surface that allows the waste water to be contained and filtered to remove particulates and solids.
- ★ When pressure washing ablative paint, use the least amount of pressure necessary to remove the growth but leave the paint intact. Where practical, use a regular garden-type hose and a soft cloth.
- ◇ Alternatively, reuse the wash water. For example, recycle it through the power washing system (a closed water recycling operation) or use it to irrigate landscaped portions of the marina. The recycled water may be treated with an ozone generator to reduce odors.

■ Legally Required

★ Highly Recommended BMPs

◇ Suggested BMPs

Painting Operations

- ★ Use brushes and rollers whenever possible.
- ★ Reduce paint overspray and solvent emissions by minimizing the use of spray equipment.
- ★ Prohibit spray painting on the water.
- ★ Use spray equipment with a high transfer efficiency. Tools such as high-volume, low-pressure (HVLP) spray guns direct more paint onto the work surface than conventional spray guns. Air-atomizer and gravity-feed guns are other types of highly efficient spray equipment.
- ★ Train staff to operate spray painting equipment properly in order to reduce overspray and minimize the amount of paint per job.
- ★ Limit in-water painting jobs to small jobs. Any substantial painting should be done on land, in the vessel maintenance area, and/or over ground cloth.
- ◇ If painting with brush or roller on the water, transfer the paint to the vessel in a small (less than one gallon), tightly covered container. Small containers mean small spills.
- ◇ Mix only as much paint as needed for a job.
- ◇ Mix paints, solvents, and reducers in a designated area. It should be indoors or under a shed and should be far from the shore.
- ◇ Keep records of paint use to show where too much paint was mixed for a job. Use the information to prevent over-mixing in the future.

Handle Solvents Carefully

- Store open containers of usable solvents as well as waste solvents, rags, and paints in covered, UL-listed, or Factory approved containers.
- Hire a licensed waste hauler to recycle or dispose of used solvents.
- Keep records of solvent and paint usage so you have a handle on the amount of hazardous waste generated on site.
- ★ Direct solvent used to clean spray equipment into containers to prevent evaporation of volatile organic compounds. Closed gun cleaning system will save you money on cleaning materials.
- ◇ Use only one cleaning solvent to simplify disposal.
- ◇ Use only the minimal amount of solvent (stripper, thinner, etc.) needed for a given job.
- ◇ For small jobs, pour the needed solvent into a small container. This will result in not contaminating a large amount of expensive solvent.
- ◇ Use soy-based solvents and other similar products with no or low volatility.

- ◇ Order your spray painting jobs to minimize coating changes. Fewer changes mean less frequent purging of the spray system. Order your work light to dark.
- ◇ Allow solids to settle out of used strippers and thinners so you can reuse solvents.

Contain Dust From Sanding

- Do not let dust fall onto the ground or water or become airborne.

Bottom Paints

Antifouling bottom paints protect hulls from barnacles and other types of fouling organisms that can interfere with vessel performance. Pesticides within them also harm fish and other non-target species. Most paints work by slowly releasing a biocide, generally cuprous oxide (Cu₂O).

Copper-based paints are not used on aluminum hulls; the interaction of copper and aluminum leads to corrosion. Instead, with the proper federal permit, tin-based paints (tributyltin or TBT) are often used on aluminum-hulled vessels greater than 82 feet. Because tin is extremely toxic, it must be applied cautiously. Concentrations of TBT as low as a few parts per trillion have caused abnormal development and decreased reproductive success in oysters, clams, and snails (EPA 1993). Tin is easily absorbed by fish through their gills and accumulates to high levels in sediments. For these reasons, federal law restricts the use of tin-based paints to aluminum vessels, boats larger than 82 feet (25 meters), and outboard motors and lower drive units. Any boatyard operator wishing to apply TBT paints must obtain a pesticide business license.

Antifouling paints can be separated into three general categories:

- **Leaching Paints.** Water soluble portions of leaching antifouling paints dissolve slowly in water, releasing the pesticide. The insoluble portion of the paint film remains on the hull. The depleted paint film must be removed before the boat is repainted. Most leaching paints are solvent based. Consequently, fumes are a concern.
- **Ablative Paints.** Ablative antifouling paints also leach some toxicant into the water. The major difference is that as the active ingredient is leached out, the underlying film weakens and is polished off as the boat moves through the water. As the depleted film is removed, fresh antifouling paint is exposed. There are several water-based ablative paints on the market that are up to 97% solvent free. As a result, levels of volatile organic compounds are substantially reduced as compared to solvent-based paints. Ease of cleanup is another advantage of water based paints.
- **Non-toxic Coatings.** Teflon, polyurethane, and silicone paints are nontoxic options. All deter fouling with hard, slick surfaces.

■ Legally Required

★ Highly
Recommended
BMPs

◇ Suggested BMPs

- Conduct shoreside sanding in the hull maintenance area or over a drop cloth (if other areas on your property will result in pollutant discharges to the water).
- Collect debris. Have your waste hauler characterize the waste and bring it to a facility authorized to manage municipal or industrial solid waste, provided that, if the waste is hazardous, the amount generated is 220 pounds per month or less. (See Waste Management chapter.)
- ★ Invest in vacuum sanders and grinders. These tools collect dust as soon as it is removed from the hull. Vacuum sanders allow workers to sand a hull more quickly than conventional sanders. Additionally, because paint is collected as it is removed from the hull, health risks to workers are reduced.
- ★ Require tenants and contractors to use vacuum sanders. Rent or loan the equipment to them.
- ★ Post signs indicating the availability of vacuum sanders and grinders.
- ★ Bring vacuum sanders to tenants if you see them working with non-vacuum equipment.
- ★ Restrict or prohibit sanding on the water to the greatest extent practical.
- ★ When sanding on the water is unavoidable, use a vacuum sander and keep the dust out of the water.
- ◇ Use a damp cloth to wipe off small amounts of sanding dust.

Contain Debris from Blasting

- Prohibit uncontained blasting.
- Perform abrasive blasting in the vessel maintenance area within a structure or under a plastic tarp enclosure. Do not allow debris to escape from the enclosure.
- Collect debris. Have your waste hauler characterize the waste and bring it to a facility authorized to manage municipal or industrial solid waste, provided that, if the waste is hazardous, the amount generated is 220 pounds per month or less.
- ★ Avoid dust entirely by using a stripper that allows the paint to be peeled off. These products are applied like large bandages, allowed to set, and are then stripped off. When the strips are removed, the paint is lifted from the hull. Dust and toxic fumes are eliminated.
- ★ Invest in a closed, plastic medium blast (PMB) system. These systems blast with small plastic bits. Once the blasting is completed, the spent material and the paint chips are vacuumed into a machine that separates the plastic from the paint dust. The plastic is cleaned and may be reused. The paint dust is collected for disposal. A 50-foot vessel will produce about a gallon of paint dust; substantially less than the many barrels full of sand and paint that must be disposed of with traditional media blasting methods.

- ◇ Investigate alternatives to traditional media blasting. Hydroblasting and mechanical peeling essentially eliminate air quality problems. Debris must still be collected, however. Consider using a filter cloth ground cover.

Engine Repair/Maintenance

- Do not wash engine parts over the bare ground or water.
- ★ Perform all engine repair/maintenance in the designated work area.
- ★ Store engines and engine parts under cover on an impervious surface like asphalt or concrete.
- ★ If you use solvents to clean engine parts, do so in a container or parts washer with a lid to prevent evaporation of volatile organic compounds. Reuse the solvent. Once the solvent is totally spent, recycle it.
- ★ Use drip pans when handling any type of liquid. Use separate drip pans for each fluid to avoid mixing. Recycle the collected fluid.
- ★ Use funnels to transfer fluids prior to disposal.
- ★ Clean engine repair areas regularly using dry cleanup methods, i.e., capture petroleum spills with oil absorbent pads.
- ◇ Use dry pre-cleaning methods, such as wire brushing.
- ◇ Avoid unnecessary parts cleaning.
- ◇ Adopt alternatives to solvent-based parts washers such as aqueous-based or bioremediating systems that take advantage of microbes to digest petroleum. Bioremediating systems are self contained; there is no effluent. The cleaning fluid is a mixture of detergent and water. Microbes are added periodically to “eat” the hydrocarbons.
- ◇ Prohibit the practice of hosing down the shop floor.

Winterize Safely

- ★ Use propylene glycol antifreeze for all systems. It is much less toxic than ethylene glycol antifreeze. Sell this item in your store.
- ★ For health reasons, ethylene glycol should never be used in potable water systems; it is highly toxic and cannot be reliably purged come springtime.
- ★ Add stabilizers to fuel to prevent degradation. Stabilizers are available for gasoline and diesel fuels and for crankcase oil. These products protect engines by preventing corrosion and the formation of sludge, gum, and varnish. Also, the problem of disposing of stale fuel in spring is eliminated.
- ★ Be sure fuel tanks are 85-90 percent full to prevent flammable fumes from accumulating and to minimize the possibility of condensation leading to corrosion. Do not fill the tank more than 90% full if you have an external overflow vent. The fuel will expand as it warms in the springtime; fuel will spill out the vent line of a full inboard tank.

■ Legally Required

★ Highly
Recommended
BMPs

◇ Suggested BMPs

Information Sources

Virginia Department of
Environmental Quality

Virginia Institute of Marine
Science, Marina Technical
Advisory Program

Education

Incorporate relevant BMPs
and requirements into slip
lease agreements.

Use flyers, meetings, etc. to
educate customers.

Maintain a list of environ-
mentally sensitive products
(cleaning agents, detergents,
polishes, etc.).

Use the fact sheet at end of
the chapter.

- ◇ Use the highest rated octane recommended by the engine manu-
facturer; premium fuels are more stable than regular.
- ◇ Be sure the gas cap seals tightly.
- ◇ Promote reusable canvas or recyclable plastic covers. Some manu-
facturers will clean and store canvas covers during the boating
season.
- ◇ Recycle used plastic covers.
- ◇ Use the minimum amount of antifreeze necessary for the job.

Educate boaters

- Post signs clearly marking designated hazardous waste disposal
sites.
- ✦ Explain the environmental benefits of regular maintenance of boat
and engines.

Stormwater

Environmental Concern

Stormwater runoff is precipitation (rainfall) that has not been absorbed by the ground. Storms that produce runoff include thunderstorms, all day rain events, nor'easters, and hurricanes. Normal activities occurring on the marina uplands, such as vehicular traffic, equipment operation, and lawn care and boat maintenance, are a source of pollution including, but not limited to, dust, petroleum products, soil particles, and fertilizers. These pollutants can be picked up by the runoff and discharged into the water. The highest concentration of these surface pollutants occurs in the runoff associated with the first ½ to 1 inch of rainfall depending on storm intensity. This phenomenon is generally referred to as the “first flush” effect. Many existing marinas were constructed prior to any thought of stormwater runoff pollution. As a result, many of these marina facilities discharge untreated stormwater directly to the marina basin. The result is that near shore areas are less able to support wildlife like young fish and crabs. Also, using the water for human recreation becomes less desirable.

Goal

Reduce the concentration of pollutants entering surface waters through use of various stormwater best management practices that cause the first flush of runoff to be slowed, detained or percolated through on-site vegetation and soils so that they are not directly discharged to the water body.

Legal Setting

Federal

Federal Water Pollution Control Act

The Federal Water Pollution Control Act, commonly known as the Clean Water Act, addresses many facets of water quality protection. It requires permits be issued for projects involving the discharge of dredged or fill material in Federal Waters and wetlands, including nontidal wetlands. In addition, it provides the authority for the National Pollutant Discharge Elimination System (NPDES) permit program for point sources of pollution. The Act prohibits the discharge of oil or hazardous substances into U.S. navigable waters. It also prohibits the use of chemical agents like soaps, detergents, surfactants, or emulsifying agents to disperse fuel, oil, or other chemicals without permission of the U.S. Coast Guard.

State

Virginia Pollutant Discharge Elimination System Regulation

A Virginia Pollutant Discharge Elimination System (VPDES) Permit may be required for a marina. The VPDES Permit Regulation governs new and existing stormwater discharges associated with industrial activity through a conveyance (point source, not “sheet-flow” runoff) to surface waters or through a municipal or non-municipal separate

storm sewer system to surface waters. Its requirements apply to storm water discharges from water transportation facilities that have vehicle (vessel) maintenance shops and/or equipment cleaning operations. The water transportation industry includes facilities engaged in foreign or domestic transport of freight or passengers in deep sea or inland waters; marine cargo handling operations; ferry operations; towing and tugboat services; and marinas (facilities commonly identified by Standard Industrial Classification (SIC) code Major Group 44).

Marinias may apply for either a VPDES individual permit (a permit written specifically for a facility), or a VPDES Stormwater General Permit.

General permits are VPDES permits issued for a class of specific dischargers. For marinas, an application for a stormwater general permit will result in, if approved, coverage under the VPDES General Permit for Storm Water Discharges associated with Industrial Activity (VARS).

All VPDES permits are valid for 5 years; however, as a general permit may have been issued prior to a facility obtaining coverage, the permittee should check to see when the general permit expires.

Virginia Stormwater Management Program

The Virginia Stormwater Management (SWM) Law and Regulations are implemented locally for private development and redevelopment projects and implemented statewide by the Department of Conservation and Recreation (DCR) for state and federal projects. The Virginia SWM Handbook is referenced for best management practice (BMP) design, construction, and maintenance, in accordance with applicable stormwater laws and state and local regulations (DCR, DEQ, CBLAD).

Virginia Erosion and Sediment Control Program

The Virginia Erosion and Sediment Control (ESC) Law and Regulations are implemented locally for private development projects, and by the Department of Conservation and Recreation for state and federal projects. The Virginia ESC Handbook is referenced for design, implementation, and maintenance of temporary ESC practices on construction sites in accordance with applicable ESC laws and state and local regulations (DCR, DEQ, CBLAD).

Best Management Practices To Control Stormwater Runoff

Best Management Practices (BMPs) can be categorized into two general groups: *Structural* and *Non-structural*. Structural BMPs include any constructed or maintained feature on a site with specific multiple functions of providing a water quality benefit. Examples of constructed BMPs include grassed swales, constructed wetlands, and bio-retention. Non-structural BMPs include any efforts to minimize the impact of the activities on, and the improvements to, the land surface on the aquatic environment, such as eliminating the use and storage of certain toxic materials, protecting existing vegetated areas, and educating the patrons of the facility on ways to minimize environmental impacts.

The most effective strategy to protect water quality will include a combination of both structural and non-structural practices. Many development sites within the Chesapeake Bay watershed utilize a combined structural and non-structural strategy referred to as “Low Impact Development” (LID) or “Better Site Design Techniques.” These strategies include multiple structural BMPs to micro-manage the stormwater runoff from easily managed (relatively small) pockets of the developed area, as well as non-structural elements such as preserving green space and minimizing and disconnecting impervious cover. Specific guidance on these comprehensive strategies can be found in the references provided at the end of this section.

The selection of an appropriate BMP for a site depends upon several factors, such as the size of the drainage area to be served, the activity or specific land use and the associated pollutants (fuel storage, transfer, vehicle parking, plaza pedestrian area, roof top, etc.), the topography, the proximity to building foundations or water supply wells, ease of access for maintenance, etc. In some cases a site can be split up into several smaller drainage areas and served by multiple BMPs. This allows BMPs to be selected based on a specific pollutant related to the activity, or other appropriate factor. The reader is encouraged to consult a qualified professional to assist in selecting and designing a structural BMP strategy for any project.

Structural BMPs – Structural BMPs will often require the development of a design or engineered plan for the implementation and long-term maintenance of the BMP. The success of a structural BMP at removing pollutants from stormwater runoff is totally dependent on it being properly designed, installed, and maintained. Though the design and installation specifications, as well as the maintenance requirements for the structural BMPs listed, are too numerous to present in this manual, (they are provided in the Virginia Stormwater Management Handbook available from the Department of Conservation and Recreation) below are a list of most common structural BMPs.

Retention Basins: A retention basin is a stormwater facility which includes a permanent impoundment, or pool of water, and, therefore, is normally wet, even during dry periods. Inflows from stormwater runoff may be temporarily stored above this permanent pool.

Extended Detention Basin: An extended-detention basin is an impoundment that temporarily stores runoff for a specified period and discharges it through a hydraulic outlet structure to a downstream conveyance system. An extended-detention basin is usually dry during non-rainfall periods. An Enhanced Extended Detention Basin includes a shallow marsh with emergent vegetation in the basin bottom which increases the potential pollutant uptake. (See Figure 1.)

Constructed Stormwater Wetlands: Constructed stormwater wetlands are manmade shallow pools that create growing conditions suitable for both emergent and aquatic vegetation. (See Figures 2&3.)

Infiltration Practices: Infiltration facilities temporarily impound stormwater runoff and discharge it via infiltration into the surrounding soil. Infiltration facilities include Infiltration Basins, Infiltration Trenches, Roof Downspout Systems, and Porous Pavement (Figure 4).

Bioretention Practices: Bioretention Practices are shallow pockets or depressions underlain by an engineered soil mixture to facilitate filtration and exfiltration into the underlying natural soils. When the natural soil horizon below the facility is not suitable for infiltration, an under drain system is used to de-water the facility. Also referred to as “rain gardens,” bioretention practices include a landscaping plan of specific plant species which results in an aesthetic site feature, as well as a water quality BMP. (See Figures 5-9.)

Sand Filters: Intermittent sand filter facilities are underground vault-like facilities which capture, pretreat, and filter the first flush of stormwater runoff. In some cases these facilities can include an above ground storage facility to store the excess volume of runoff from larger storms. (See Figure 10.)

Oil Grit Separators: Oil grit separators are another form of filter system. Water from parking lots and other areas likely to have hydrocarbons should be directed through Oil Grit Separators (or oil absorbent fabric) before entering any other management structure.
**Note: this is not a preferred method due to the excessive amount of maintenance required.

Grassed Swale: A grassed swale is a broad and shallow earthen channel vegetated with erosion resistant and flood-tolerant grasses. Check dams are strategically placed in the swale to encourage ponding behind them. A Water Quality Swale is a broad and shallow earthen channel vegetated with erosion resistant and flood tolerant grasses, and underlain by an engineered soil mixture to facilitate filtration and exfiltration into the underlying natural soils. When the natural soil horizon below the swale is not suitable for infiltration, an under drain system is used to dewater the swale.

Vegetated Filter Strip: A vegetated filter strip is a densely vegetated strip of land engineered to accept runoff from upstream development as overland sheet flow. It may adopt any naturally vegetated form, from grassy meadow to small forest.

All stormwater management structures must be maintained to remain effective.

Refer to Table 2 for assistance in selecting a structure that is appropriate for your property.

Non-Structural BMPs - Non-structural BMPs include everything from public education to street sweeping efforts to remove debris and sediments from roadway and parking areas. Non-structural BMPs also include site design practices which avoid impacting environmentally sensitive areas in an effort to minimize the overall impact of the development on the hydrologic cycle. The following represent just some of the non-structural practices considered to be effective at reducing nonpoint source pollution:

- Write a Stormwater Pollution Prevention Plan with the following components:

This plan, required for the VPDES Permits, including the General Permit, must: 1) be prepared in accordance with good engineering practices; 2) identify potential sources of pollution that may reasonably be expected to affect the quality of storm water dis-

“All stormwater management structures must be maintained to remain effective”

*"Create a
compost area
for yard debris
and fish waste.
This material is a
good alternative
to chemical
fertilizers and it
is free"*

Legally Required ■

Highly
Recommended ★
BMPs

Suggested BMPs ◇

charges associated with industrial activity at the facility; and 3) describe and ensure the implementation of practices that are to be used to reduce the pollutants in stormwater discharges associated with industrial activity at the facility. The stormwater pollution prevention plan requirements may incorporate by reference other approved plans or documents such as an erosion and sediment control plan, a spill prevention control and countermeasure (SPCC) plan, etc. Some of the plan requirements may be:

- Used oil management
 - Spent solvent management
 - Proper disposal of spent abrasives
 - Disposal of vessel wastewater
 - Spill prevention and control
 - Safe fueling procedures
 - General good housekeeping
 - Appropriate painting and blasting procedures
 - Used battery management
- ★ General good housekeeping can be an effective management tool for accumulated dust and dirt, litter and trash.
- Keep cleaning and maintenance material tidy and stored in covered areas.
 - Store used oil containers, spent solvents, used engines and parts, discharged batteries, opened or punctured fertilizer bags, insecticide/herbicide containers, detergents, etc., under cover.
 - Inspect the stormwater system regularly, especially before and after large storms, to assure that it is in proper working order.
- ★ Limit the use of chemicals by using Integrated Pest Management (IPM) techniques and planting native plant species.
- IPM is an environmentally friendly alternative to the use of conventional pesticide products. Examples of safer solutions for landscape pests include insecticidal soap (2 ½ tbsp. of dish soap per gallon of water); horticultural oil (add 2 ½ tbsp of vegetable oil to the insecticidal soap); *Bacillus thuringiensis* (BT)-a bacterium which controls caterpillars (available at nurseries); coffee grounds and tea bags to prevent mosquito larvae from hatching; shallow pans of beer to help control slugs.
- Try using the least toxic alternative(s) before taking more drastic measures.
- Certain native plant species are naturally resistant or repulsive to insects.
- ★ Create a compost area for yard debris and fish waste. This material is a good alternative to chemical fertilizers and it is free.

◇ Stencil Storm Drains

Stencil storm drains with the words “Don’t Dump” and “Chesapeake Bay Drainage” (if appropriate). Stencils and instructions are available from the Chesapeake Bay Foundation and the Center for Marine Conservation. Be sure to get permission from the county or city department that maintains storm drains in your community. Generally, it is the Department of Public Works. (See “information sources” at the end of the chapter for phone numbers.)

Combined Structural and Non-Structural Site Design Practices - The goal of these strategies is to minimize the need for large or maintenance intensive structural BMPs. This can be accomplished by developing the site to take advantage of its natural features such as heavily vegetated areas to absorb stormwater runoff. This requires directing the site drainage to such areas, and maintaining them to hold and absorb the first flush of runoff. In the absence of natural or existing areas appropriate for stormwater runoff, multiple bioretention practices can be located to intercept the surface drainage from impervious areas.

The following represent some examples of site design techniques that will improve the overall quality of the runoff leaving the site:

★ Practice Low Impact Development

The goal of low impact development is to develop a site without altering the existing hydrologic cycle. The approach takes advantage of a site’s natural features—including vegetation—to minimize the need to build expensive stormwater control devices. It is counter to traditional stormwater management which uses structures like curbs, gutter, and storm drains to move water off-site as efficiently as possible. Traditional structures cause unnatural volumes of runoff to move into receiving waters at high velocity.

- ★ Develop the site to take advantage of a site’s natural features - including vegetation - to minimize the need to build expensive stormwater control devices.

★ Cultivate Vegetated Areas

Healthy soil and vegetation capture, treat, and slowly release stormwater. The water is cleaned through a combination of microbial action in the soil, vegetative uptake, evaporation, and transpiration. To cultivate vegetated areas, you should:

Plant environmentally-sensitive landscapes at the edge of parking lots and within islands in parking lots. Refer to Appendix II for information on the BayScapes Program which describes these types of plantings.

Plant vegetated buffers between your upland property and the water’s edge.

- ★ Position downspouts so that they drain to vegetated areas. Avoid draining to concrete or asphalt.

■ Legally Required

★ Highly
Recommended
BMPs

◇ Suggested BMPs

Information Sources

BayScapes Program

Center for Marine Conservation, "Million Points of Blight"-Storm Stenciling Program

Chesapeake Bay Foundation

Chesapeake Bay Local Assistance Department

Department of Conservation and Recreation, Division of Soil and Water Conservation

Local Planning/Zoning Offices

Virginia Department of Environmental Quality

Virginia Institute of Marine Science, Marina Technical Advisory Program

Education

Use pamphlets, flyers, newsletters, and meetings to convey the importance of any environmental precautions that have been implemented at the marina.

- *Virginia Stormwater Management Handbook*- Available from the Department of Conservation and Recreation

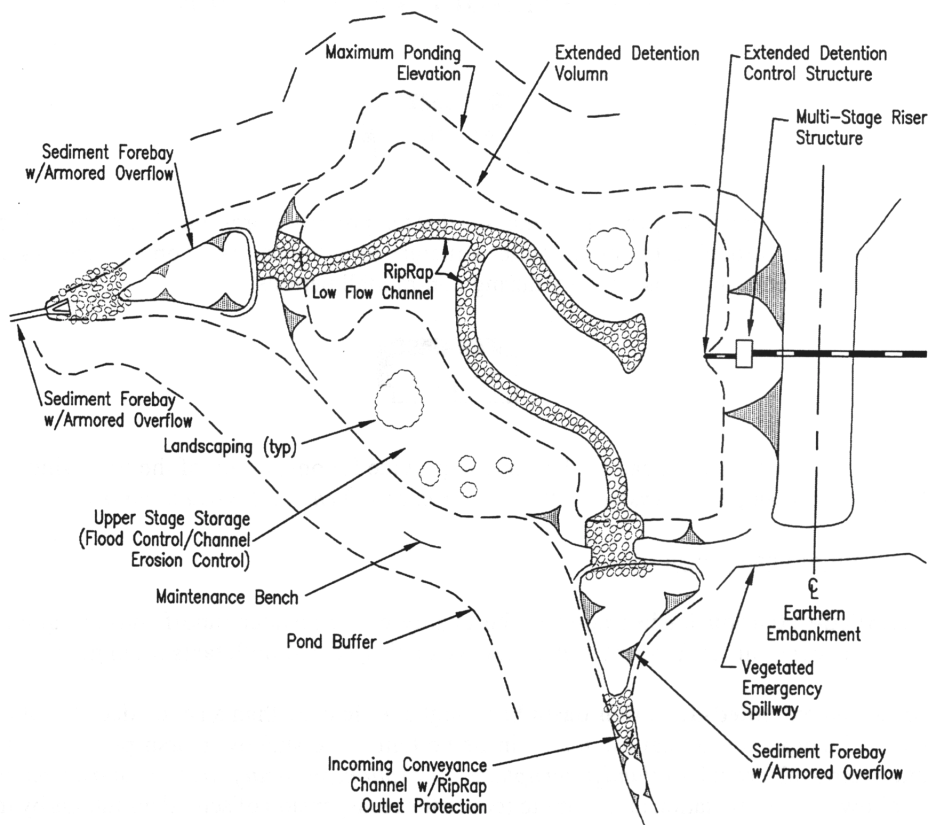
- *Erosion and Sediment Control Handbook*- Available from the Department of Conservation and Recreation

- ✧ Use grassed swales or water quality swales to direct stormwater on your property. (Refer to structural controls above.) Grassed swales are low gradient conveyance channels planted with erosion-resistant vegetation. They improve water quality by filtering out particulates, taking up nutrients, and promoting infiltration. Also, water generally moves more slowly over a grassed swale than it would in a pipe.
- ✧ Minimize the Amount of Impervious Area
Impervious areas do not allow water to settle into the ground where natural filtration can occur. Also, these areas collect pollution during dry spells. When a rain event occurs, the pollution is captured in the runoff and funneled downhill. To minimize the amount of impervious area, you should:
 - Pave only those areas that are absolutely necessary.
 - Minimize the length of new roadway required to serve new or expanding marinas.
 - Plan roads so they do not cross sensitive areas such as tidal wetlands.
 - Consider alternatives to asphalt for parking lots and vessel storage areas such as dirt, gravel, seashells, engineered porous pavement. (See figure 4 for a depiction of porous pavement.)
 - One such alternative is:
A non-toxic, organic soil binder derived from the *Plantago* plant family. When this binder is combined with crushed aggregate (i.e., gravel, shells) and soil, it creates a somewhat permeable surface that will not erode. For less than or equal to the cost of asphalt, it is a resilient material that will not crack during winter freeze/ thaw cycles, can be repaired by adding more material and tilling the surface, and can be dug up with a shovel to plant trees and shrubs.

■ Control Sediment from Construction Sites

Use devices such as hay bales, silt fences, storm drain filters, sediment traps, and earth dikes to prevent sediments from leaving construction areas. (This an Erosion and Sediment Control law.)

Figure 1. Dry Extended Detention Pond



Source: Virginia Stormwater Management Handbook.

Figure 2. Constructed Stormwater Wetlands, Plan

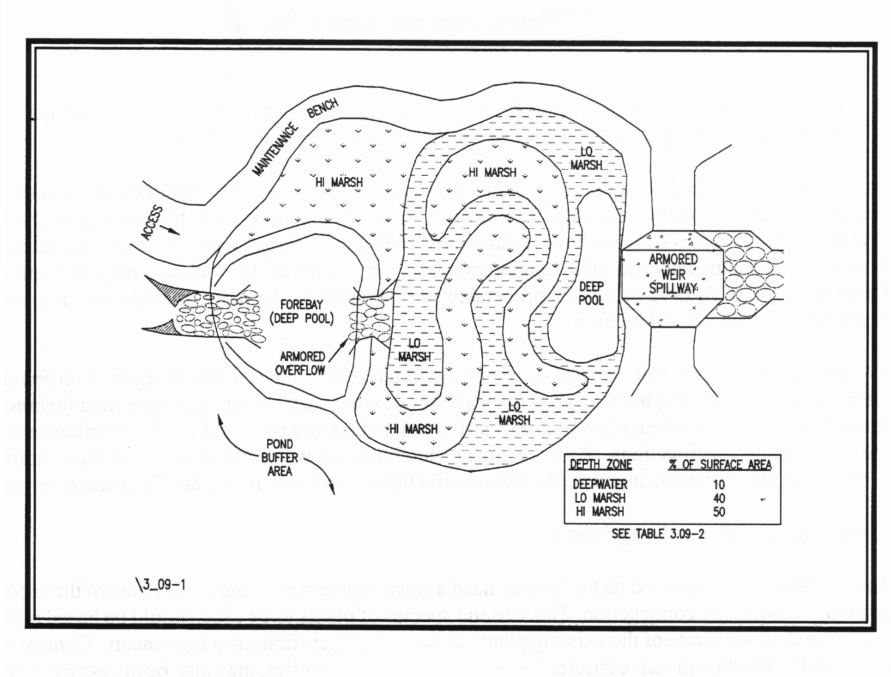
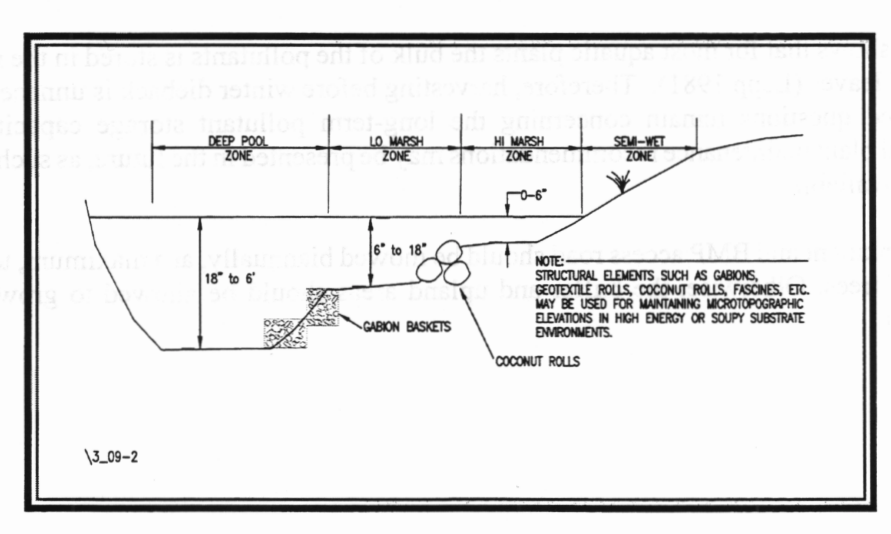
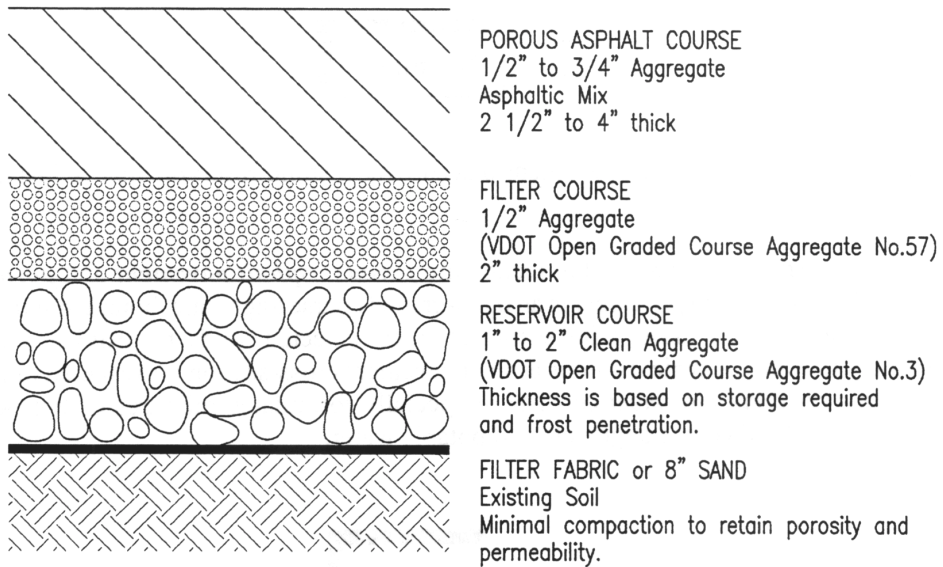


Figure 3. Constructed Stormwater Wetlands, Depth Zones



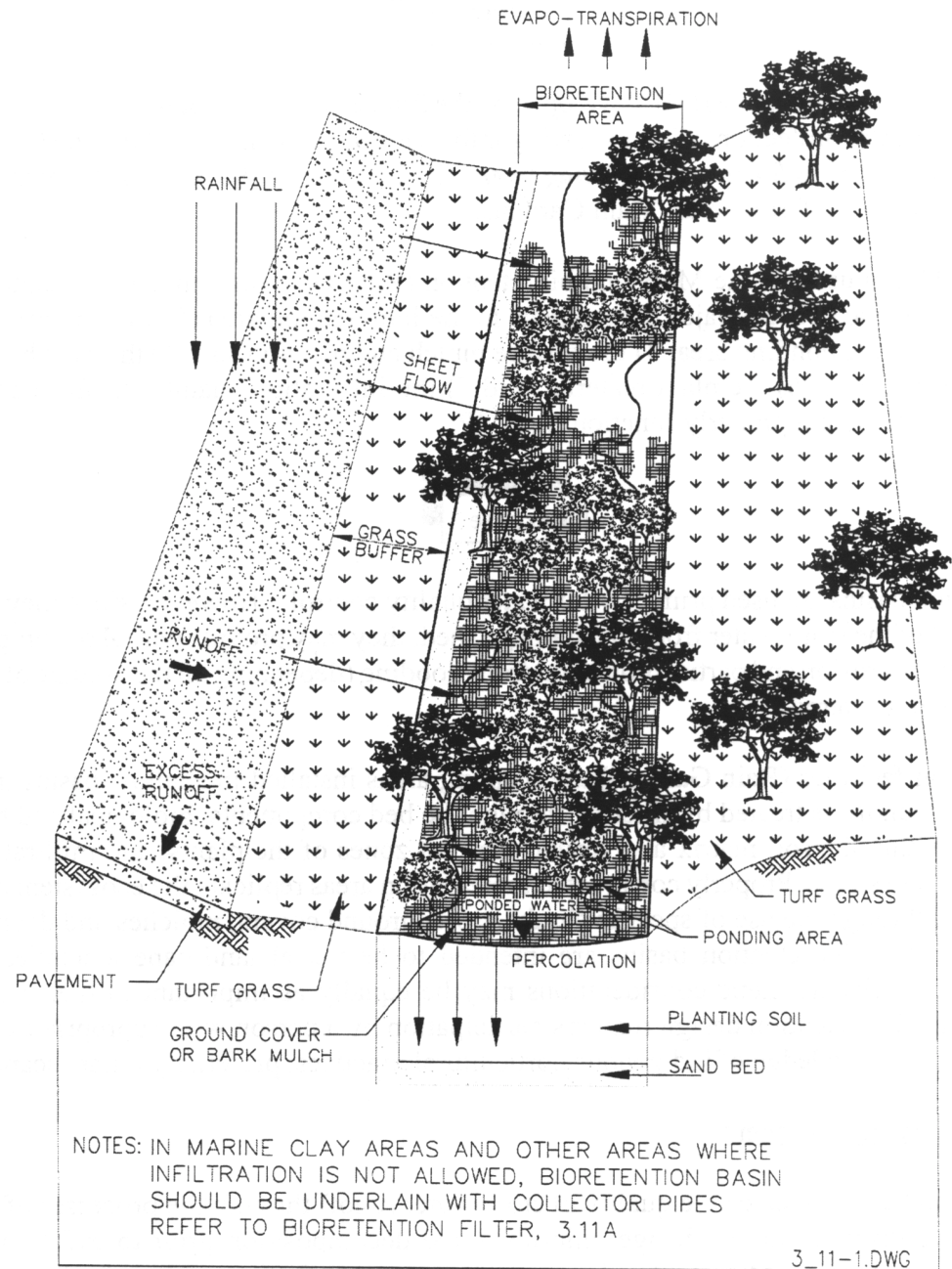
Source: Virginia Stormwater Management Handbook.

Figure 4. Porous Pavement Section



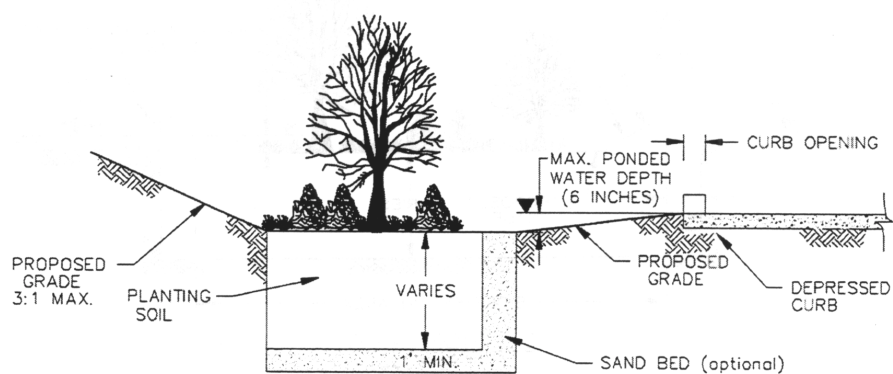
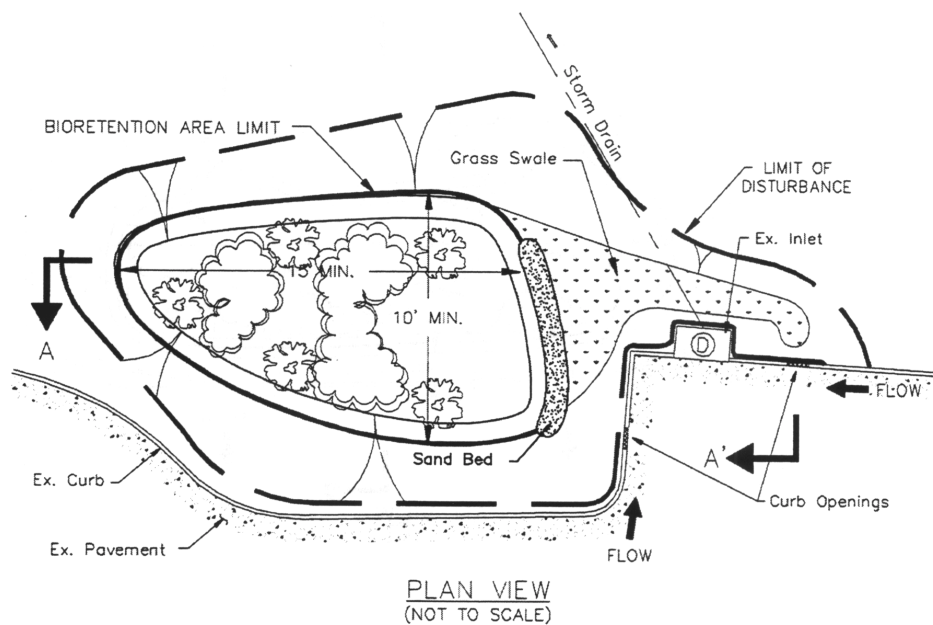
Source: Virginia Stormwater Management Handbook.

Figure 5. Bioretention Basin



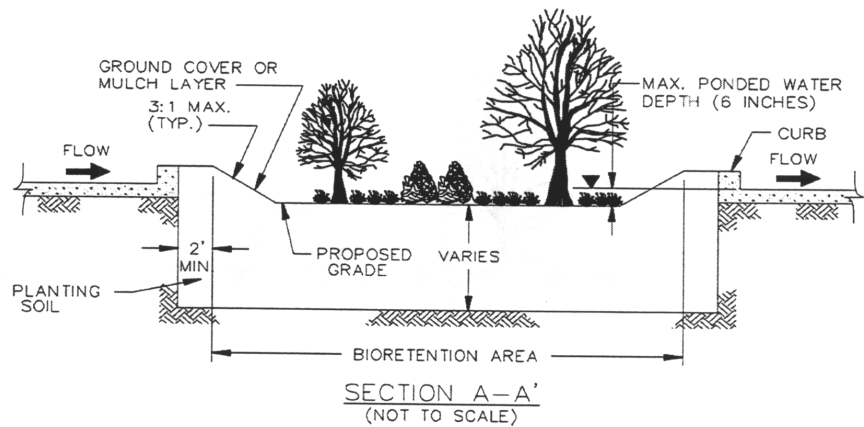
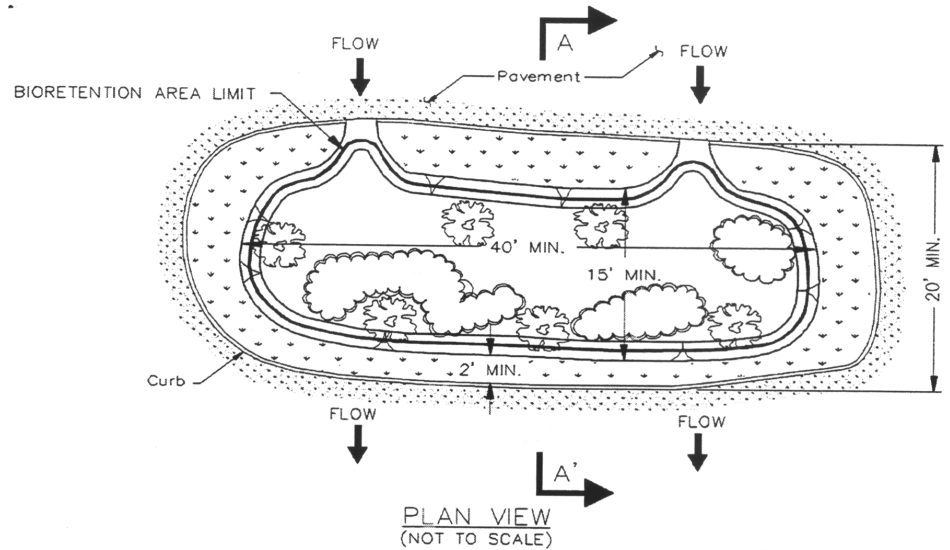
Source: Virginia Stormwater Management Handbook.

Figure 6. Bioretention Basin at Edge of Parking Lot with Curb



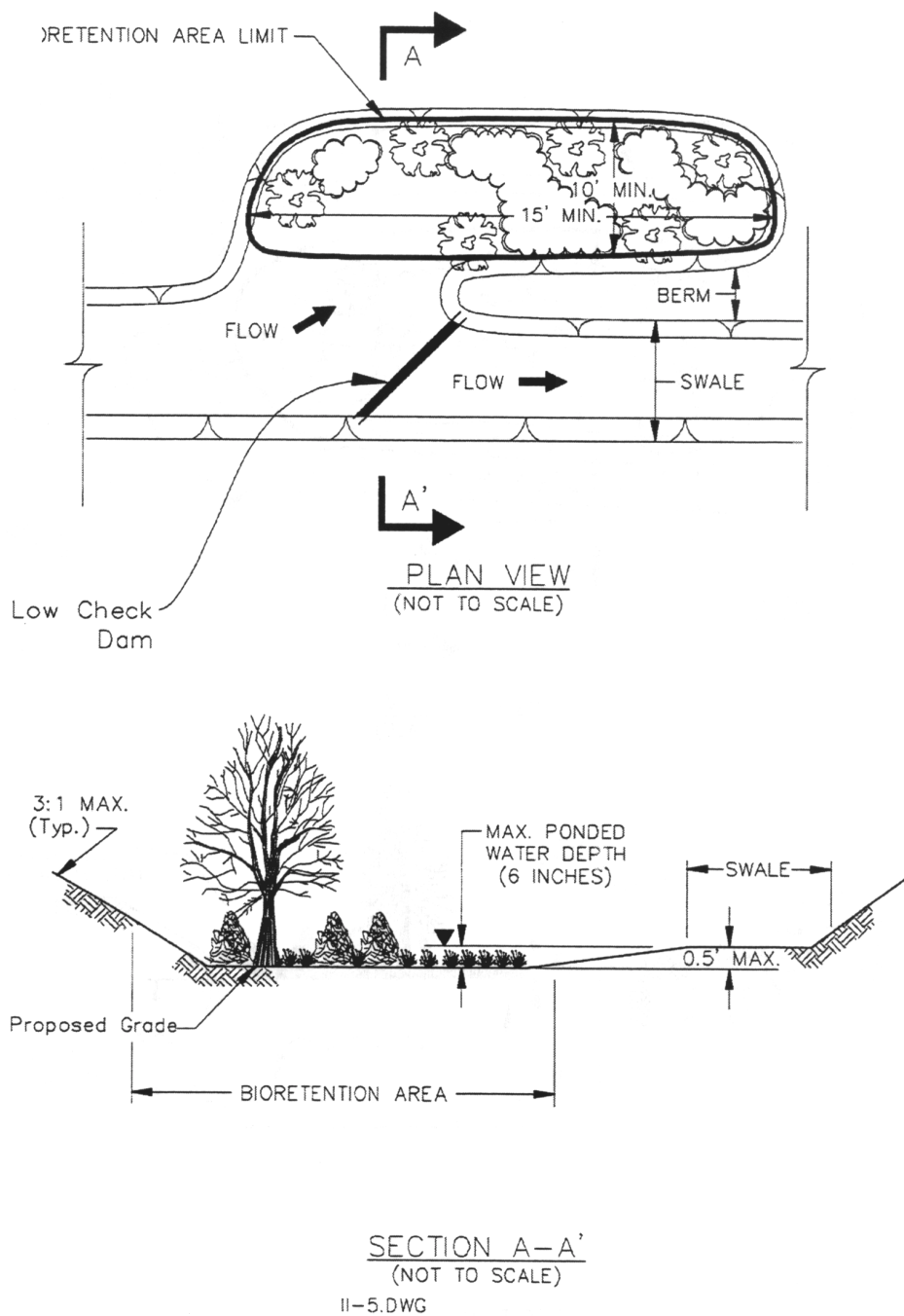
Source: Virginia Stormwater Management Handbook.

Figure 7. Bioretention Basin in a Planting Island in a Parking Lot



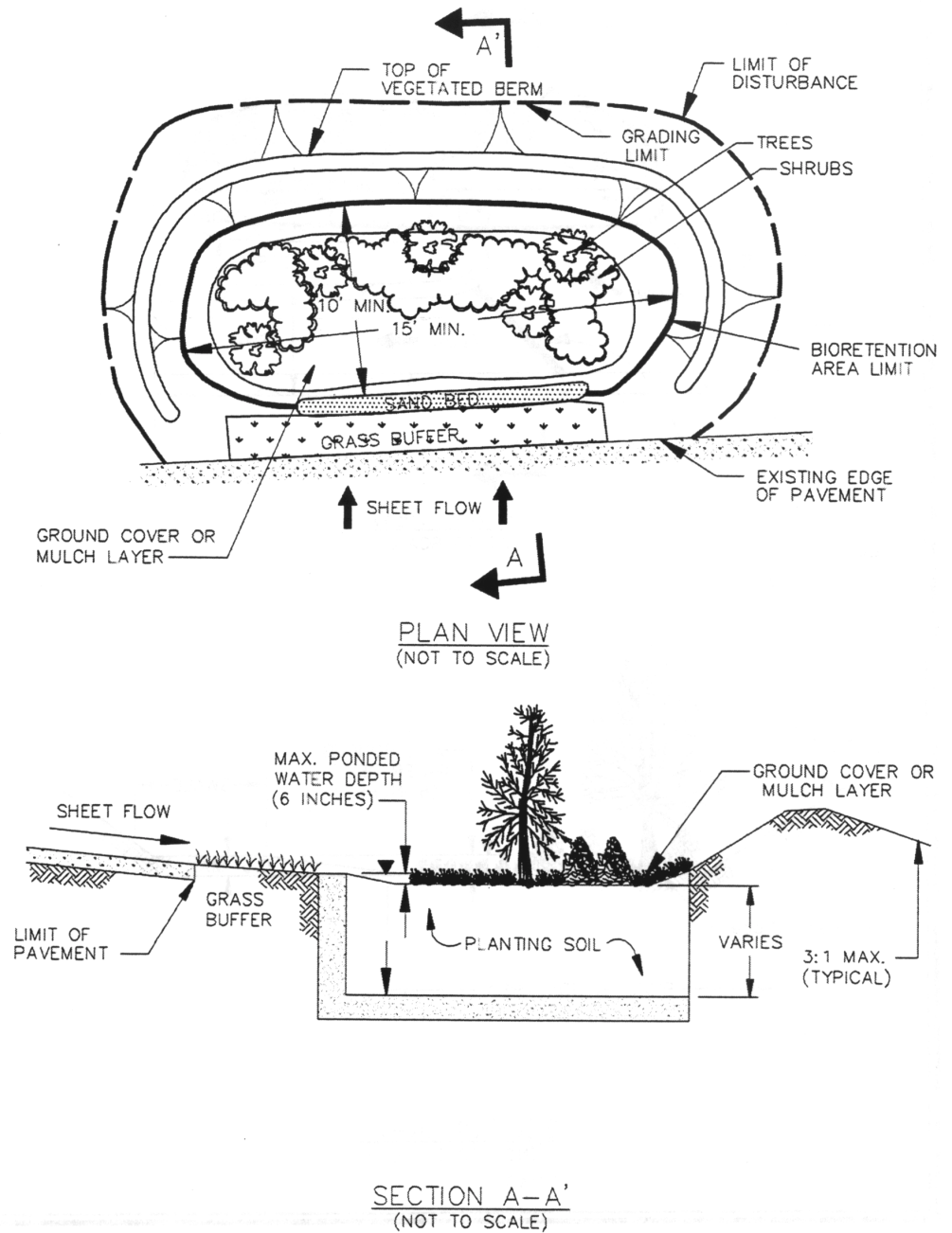
Source: Virginia Stormwater Management Handbook.

Figure 8. Bioretention Basin Adjacent to a Drainage Swale



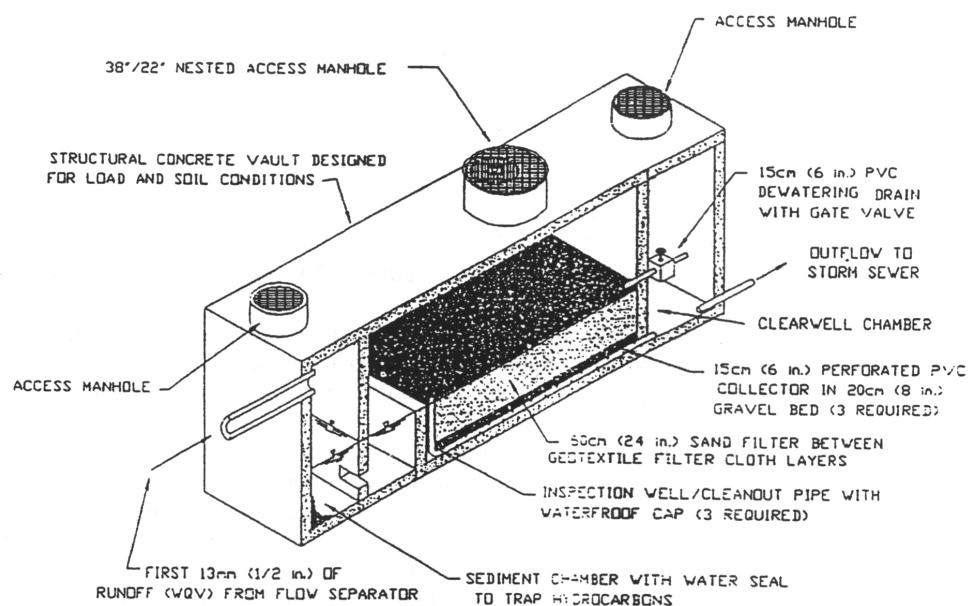
Source: Virginia Stormwater Management Handbook.

Figure 9. Bioretention Basin at Edge of Parking Lot without Curbs



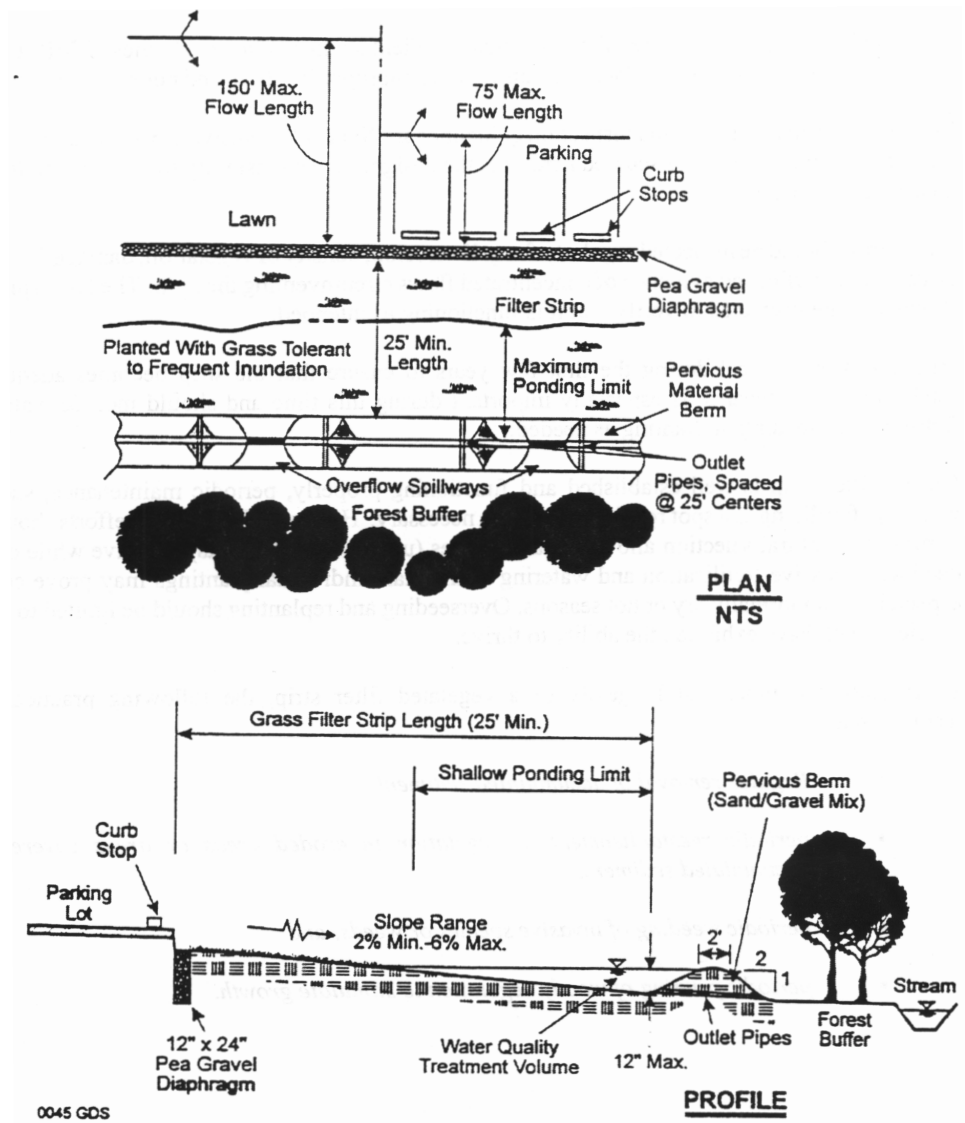
Source: Virginia Stormwater Management Handbook.

Figure 10. Sand Filter



Source: Virginia Stormwater Management Handbook.

Figure 11. Vegetated Filter Strip



Source: Virginia Stormwater Management Handbook.

Screening Tools for Stormwater Management Best Management Practices Physical Feasibility

BMP

Factors	Pond Systems Wet & Dry ED Ponds	Infiltration Systems French Drains, Dry Wells, Porous Pvmt., Trenches	Wetland Systems Stormwater Wetlands	Filter Systems Sand & Peat/Sand Filters Grassed Swales	Water Quality Inlets Oil/Grill Separators
Slope	●	○	●	○	●
High Water Table	●	○	●	○	●
Close to Bedrock	◐	○	◐	◐	○
Proximity to Foundations	●	○	●	●	○
Space Consumption	○	●	○	●	●
Maximum Depth	●	○	◐	○	○
Restricted Land Use	●	●	○	●	○
High Sediment Input	◐	○	◐	○	○
Wetlands/Forest Permits	●	●	○	●	●
Stream Warming	○	●	○	●	●

- May Preclude the Use of a BMP
- Generally Not a Restriction
- ◐ Can Be Overcome with Careful Site Design

*Source: Krumble, Peter, Lorraine Herson-Jones, and Thomas Schueler.
1993. Applicant's Guide for 10% Rule Compliance. Annapolis, MD:
Chesapeake Bay Critical Area Commission.*

Habitat and Species

Environmental Concerns

Quality habitat is critical to the well-being of our wildlife. Shoreline and streambank erosion leads to a loss of upland, wetland, and submerged habitat. Boat wakes can cause the erosion of sensitive habitat. Loss of submerged aquatic vegetation inhibits the reproductive success of many organisms and contributes to the overall decline in water quality.

Invasive/exotic species may become attached to vessels and trailers and can be accidentally introduced into waterways. Once introduced, exotics can be very invasive and difficult to control. When exotic plants or animals spread, they contribute to the degradation of water quality and fish and wildlife habitat by replacing native species.

Protected and recreational/commercial species frequent the same areas as boaters and marinas and can be adversely affected by negligent activities. Bottlenose dolphin and sea turtles, as well as oysters, clams, sport fish, etc., are just a few of the many animals that share the waters of Virginia.

Goals

1. Minimize the loss of essential wildlife habitat and minimize the impact to protected lands.
2. Avoid the introduction of exotic plants and animals.
3. Minimize the injury and death of protected and commercial/recreational species.

Legal Setting

Federal

Marine Mammal Protection Act of 1972

The 1972 Marine Mammal Protection Act established a Federal responsibility to conserve marine mammals with management vested in the Department of Interior for sea otter, walrus, polar bear, dugong, and manatee. The Department of Commerce is responsible for cetaceans and pinnipeds, other than the walrus.

With certain specified exceptions, the Act establishes a moratorium on the taking and importation of marine mammals as well as products taken from them, and establishes procedures for waiving the moratorium and transferring management responsibility to the states.

The law authorized the establishment of a Marine Mammal Commission with specific advisory and research duties.

Annual reports to Congress by the Departments of Interior and Commerce and the Marine Mammal Commission are mandated.

The 1972 law exempted Indians, Aleut, and Eskimos (who dwell on the coast of the North Pacific Ocean) from the moratorium on taking provided that taking was conducted for the sake of subsistence or for

the purpose of creating and selling authentic native articles of handi-craft and clothing. In addition, the law stipulated conditions under which the Secretaries of Commerce and Interior could issue permits to take marine mammals for the sake of public display and scientific research.

Endangered Species Act of 1973

The 1973 act implemented the Convention on International Trade in Endangered Species of Wild Fauna and Flora (T.I.A.S. 8249), signed by the United States on March 3, 1973, and the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (50 Stat. 1354), signed by the United States on October 12, 1940.

The 1973 Endangered Species Act provided for the conservation of ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend, both through federal action and by encouraging the establishment of state programs.

State

The Virginia Department of Game and Inland Fisheries' regulations prohibit the taking of wildlife (includes harassing and harming) unless permitted by law or regulation. As applied to threatened or endangered species, "harming" may include significant habitat modifications or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

It is illegal to harass protected and endangered animals such as marine mammals (whales, dolphins, seals), sea turtles, and migratory birds (osprey, shorebirds, ducks and geese).

Best Management Practices For Protecting Sensitive Areas

- ✧ **Minimize Impervious Areas to Reduce Runoff** - Impervious areas such as concrete pads and asphalt roads funnel water to specific areas. By maintaining areas with grass or gravel or other areas that let water percolate, water and the pollutants (fertilizer, etc.) it picks up are filtered naturally before reaching the waters of your marina.

Keep paved areas to an absolute minimum, i.e., just designate work areas and roadways for heavy equipment.

- ✧ **Use Upland and Inland Areas** - This offers a two-fold benefit. First, by using upland or inland areas, the disturbance to sensitive shorelines is diminished. Second, upland and inland areas can be far enough away from the water to allow for the natural filtering of pollutants.

Locate buildings, workshops, and waste storage facilities in upland areas, away from fragile shoreside ecosystems, to the greatest extent possible. Upland areas also provide a measure of protection against floods.

"By maintaining areas with grass, or gravel or other areas that let water percolate, water and the pollutants (i.e. fertilizer, etc.) it picks up are filtered naturally before reaching the waters of your marina."

■ Legally Required

Highly

✧ Recommended BMPs

◇ Suggested BMPs

Locate parking and vessel storage areas away from the water, where feasible.

Consider inland areas for boat repair activities and winter storage. Use hydraulic trailers to quickly and easily move boats to inland storage locations.

✧ **Practice Proper Cleaning Techniques For Transporting Trailered Boats** - Trailered boats can harbor exotic species. Many exotics damage ecosystems by out-competing the indigenous species. The proper cleaning of a boat before it is trailered to another body of water can help prevent the spread of potentially harmful exotics.

- Inspect areas where water can be trapped (bilges).
- Drain these areas before each trip.
- Empty all trash.
- Wash and dry boat and trailer before and after each trip.

✧ **Promote “No-wake” Zones in Areas Where Shoreline Erosion is a Potential Problem** - No-wake zones protect the environment surrounding your marina. Wave action causes erosion that could weaken your marina infrastructure (seawall erosion, etc.) and destroy submerged aquatic vegetation (by stirring up silt and dirt that block light from reaching the plants).

✧ **Expand Upward (i.e. dry stack storage)** - Marinas are usually located in areas with limited land area. By expanding upward, a marina can create the infrastructure to expand business while minimizing the need to disturb sensitive habitat.

- Locate boatels outside of the 100-foot Resource Protection Area as they are not water-dependent facilities.
- Rather than adding wet slips, expand storage capacity by adding dry stack storage. Boatels provide the following environmental benefits:
 - Dry-stacked boats do not accumulate marine growth. Consequently, toxic antifouling paints are not necessary and the associated need to wash, scrap, and paint is eliminated.
 - Dry-stacked boats are less likely to accumulate water in their bilges. They are, consequently, less likely to discharge oily bilge water.
- Control stormwater runoff from dry stack areas as well as from any expanded parking areas.
- Keep forklifts well-tuned to prevent grease or oil from dripping onto staging areas or into the water.

✧ **Practice Water-wise Landscaping** - The use of native plants, selective landscaping and the timing of watering all reduce the amount of water needed at your marina. This reduces runoff and saves you time and money (less staff time for watering and less expense on water bills). See Appendix II -Virginia’s Bayscapes Program - for more information and a list of beneficial plants to use in the Chesapeake Bay region.

- Water only when plants indicate that they are thirsty: shrubs will wilt and grass will lie flat and show footprints. Water in the early morning or early evening as temperatures generally are cooler. Plants will not be shocked and water loss to evaporation will be minimized.
- Select plants that are suited to the existing conditions. (i.e., soil, moisture, and sunlight) so that they will require little care in terms of water, fertilizer, and pesticides. Refer to Appendix II, the Bayscapes Program, for a sampling of beneficial plants.
- Water deeply and infrequently rather than lightly and often. Deep watering promotes stronger root systems which enable plants to draw on subsurface water during hot spells and droughts.
- Select equipment that delivers water prudently. Sprinklers work well for lawns. Soaker hoses or drip irrigation systems deliver water directly to the roots of shrubs, flowers, and vegetables with minimal loss to evaporation.
- Place mulch (wood chips, bark, grass clippings, nut shells, etc.) to a depth of 3-4" around plants to keep water in the soil, prevent weeds, and reduce the amount of sediment picked up by storm water. Planting groundcovers at the base of trees serves the same function.
- Group plants with similar water needs together. This practice will ease your maintenance burden, conserve water, and benefit the plants.
- Replace lawn areas with wildflowers, groundcover, shrubs, and trees.
- Recycle "gray water." Gray water is water that has been used once- maybe for dishwashing or in a washing machine - but is not overly contaminated. It can be filtered and used to water landscaped areas. Because regulations vary, be sure to check local ordinances for permit requirements and written approval before pursuing this option.
- Collect rainwater by directing downspouts into covered containers. Use to water your landscaped areas.

✱ **Adopt Integrated Pest Management Practices (IPM)** - The use of pesticides and other chemicals to manage pests is a potential hazard to aquatic life. IPM minimizes the use of conventional pesticide products. Examples of safer solutions for landscape pests include insecticidal soap (2 ½ tbsp. of dish soap per gallon of water); horticultural oil (add 2 ½ tbsp of vegetable oil to the insecticidal soap); *Bacillus thuringiensis* (BT)-a bacterium which controls caterpillars (available at nurseries); coffee grounds and tea bags prevent mosquito larvae from hatching; shallow pans of beer help control slugs.

- Try using the least toxic alternatives before taking more drastic measures.
- Purchase the least toxic chemical in the smallest amount practical.
- Do not use pesticides just before a rainfall or on a windy day.
- Apply insecticides during the evening when honeybees and other beneficial insects are less active.

"The use of pesticides and other chemicals to manage pests is a potential hazard to aquatic life. IPM is an environmentally friendly alternative to the use of conventional pesticide products."

■ Legally Required

Highly
✱ Recommended
BMPs

◇ Suggested BMPs

For more information contact your local county extension agent (District offices are in the appendix and local numbers are in the blue section of your phone book.)

- Do not apply pesticides near water, i.e., shore, wells, streams, ponds, bird baths, swimming pools, etc.
- Select plants that are disease and insect resistant, that will out-compete common weeds, and that can thrive on your property. Refer to the BayScapes list of native plants (Appendix II) and consider the degree of sun exposure, slope, drainage, amount of shade, wind, volume of foot traffic, soil type, temperature variations, and other environmental factors.
- Mow lawn areas properly to suppress weeds. Varieties of grass that grow better in cooler weather should be mowed to no less than 2.5 inches in height. Grasses that grow better in warm weather should be mowed to no less than 1.5 inches.
- Pull weeds by hand to reduce reliance on herbicides.
- Boost your own tolerance for weeds and other pests. If it is not actually harming anything, leave it alone.
- Foster natural predators such as spiders, praying mantis, dragonflies, lacewings, soldier beetles, birds, bats, frogs, lizards, and certain snakes and toads.
- Use natural agents such as milky spore disease for grubs and Japanese beetles, *Bacillus thuringiensis* (BT), to control mosquito and small moth larvae, and sabadilla for chinch bugs.
- Use pesticides only after all other options have been exhausted. Use organic alternatives to chemical pesticides. Also, rather than broadcasting pesticides, apply them directly to problem areas.
- Treat only serious or threatening intolerable pest infestations.

✧ **Conserve Sensitive Land** - Land that is considered sensitive usually is land that is extremely important to the welfare of wildlife. For example, submerged aquatic vegetation (or SAV) are underwater grasses often found in shallow (usually less than 6 feet), tidal and non-tidal areas. They are important habitat for fish and shellfish, particularly the blue crab, and are a food source for several waterfowl species. In addition, SAV adds oxygen to the water and reduces wave energy, thereby protecting shoreline and bottoms. Wetlands and marshes are also considered sensitive.

- Provide a serene setting for your marina by placing adjacent, sensitive land in a conservation trust. Income, estate, and property tax benefits are available.
- Sell or donate the land (or the development rights to the land) to a local land trust or a non-profit organization.

◇ **Education** - Educate your staff to answer boater's questions on the relationship between good boating practices and a healthy environment (i.e., good boating practices=more fish and wildlife and improved water quality).

- Sell species identification cards in the marina store.

Helping customers identify wildlife encourages them to practice responsible boating in order to minimize human impacts on wildlife.

- Post signs and distribute pamphlets to help educate the public.
The boating public, visitors to your marina, and others are not always aware of the sensitivity of nearby habitat and species. By providing signs and pamphlets, people at your marina will learn about your concerns.

Best Management Practices For Creating Habitat Areas

Maintain and/or Develop Vegetated Areas

- ★ Maintain vegetated buffers (grassy or wooded) between all impervious areas (i.e., parking lots and boat storage areas) and the water.
- ★ Plant vegetated areas with “beneficial” plants: those plants that require minimal care in terms of trimming, watering, and applications of fertilizer and pesticides. Native, or indigenous, plants demand little care since they are adapted to the local climate and soil types. Also, many horticultural varieties and imported plants may be considered beneficial if they have few maintenance requirements and if they do not displace naturally occurring vegetation (that is, if they are not invasive). Refer to Appendix II.
- ★ Select perennial plants instead of annuals. Perennial plants need only be planted once, tend to shade out most weeds, and few require additional water or maintenance.
- ★ Compost leaves, branches, grass trimmings, and other organic matter. Use the mature compost to nourish your soil. Alternatively, chip branches and leaves and use as mulch to discourage weeds and to conserve moisture.
 - Vegetation filters and slows the flow of surface water runoff, stabilizes shorelines, and provides wildlife habitat, flood protection, and visual diversity.
 - Choose plants that bear flowers, fruit, nuts, and seeds to attract birds, small mammals, and other wildlife.
 - Maintain proper soil pH and fertility levels. Fertility describes the presence of nutrients and minerals in the soil. Acidity and alkalinity levels are indicated by pH. These two measures together tell you which plants your soil can support. Soil pH may be adjusted by adding lime (base) or gypsum (acid). Add organic matter such as compost, leaf mold, manure, grass clippings, bark, or peat moss to improve fertility.
 - Annually, submit a soil sample to your local Agriculture Cooperative Extension Agent to determine fertility, pH, and application rates for soil amendments.
 - Foster beneficial critters. For example, earthworms move through the soil feeding on microorganisms. In the process, they aerate the soil, improving the flow of water and air to plant roots.

Information Sources

Virginia Marine Resources Commission

Virginia Marine Science Museum

Virginia Institute of Marine Science, Marina Technical Advisory Program

U.S. Coast Guard Auxiliary

Department of Conservation and Recreation, Virginia Natural Heritage Program

Virginia Department of Game and Inland Fisheries

Chesapeake Bay National Estuarine Research Reserve in Virginia

U.S. Coast Guard

Department of Environmental Quality

Chesapeake Bay Local Assistance Department

■ Legally Required

Highly
★ Recommended
BMPs

◇ Suggested BMPs

Education

A list of private consultants is generally available from the Virginia Department of Game and Inland Fisheries regarding affects and potential effects of marina construction and operation on sensitive wildlife species.

Virginia Watercraft Owner's Guide

PWC-Personal Watercraft In Virginia (boating safety book used by VDGIIF)

Consider Oyster Gardening - Oysters are natural water filters that improve water quality by filter-feeding on microscopic algae. A single 3-inch oyster can filter up to 50 gallons of water a day. Developing an oyster float in your marina is simple, helps filter the water, and acts as a point of interest for customers. Contact the Tidewater Oyster Gardeners Association (see Appendix I) for more information. Oysters grown at marinas are not allowed to be sold for human consumption

- ★ Practice oyster gardening at your marina.

Guidelines For Responsible Vessel Operation Around Wildlife

- Steer clear of animals! Do not approach nesting or resting birds, sea turtles or dolphins closer than 50 yards.
- If you have to move close to animals because of channel markers, shallow water or traffic, maintain set speed and course.
- Never surround animals with vessels or circle animals or nests with a moving vessel.
- Avoid sensitive habitats such as the shallow water around marshes and submerged vegetation.
- If you wish to observe animals, approach them slowly from the side (not head on or from behind as if to chase them). Idle slowly or remain in neutral and choose a set course. If the animal(s) leave the area, do not chase them. Limit your observation time to 15 minutes or less.
- Remember, these are wild animals trying to survive in nature. You are a visitor to their habitat and should respect their space and their need to survive without being constantly disturbed.

Information Sources

American Boat and Yacht Council

BOAT US

Center for Marine Conservation

Department of Game and Inland Fisheries

National Marine Manufacturers Association

US Coast Guard

US Coast Guard Auxiliary

Virginia Department of Health

Virginia Institute of Marine Science, Marina Technical Advisory Program

Virginia Marine Science Museum

Legally Required ■

Highly Recommended ★
BMPs

Suggested BMPs ◇

Boater Education

Environmental Concerns

Boaters and marina operators have the potential to negatively impact the water quality in and around a marina through neglect and poor judgment. In order for a marina to maintain its standards, it is important to educate your clientele and employees on any issues that could affect the water quality and appearance of the marina (recycling, boat cleaning, fueling, painting, sewage, fish wastes, and hazardous materials). The following list of best management practices (BMPs) provides guidance for these issues.

Goals

Provide boaters and employees with information on water pollution and provide them with ways to correct and prevent any water pollution activities in which they may be involved.

Legal Setting

DEQ's solid waste management program is authorized under the Virginia Waste Management Act, Sections 10.1-1400 through 10.1-1457 of the Code of Virginia. The Virginia Waste Management Board promulgates and enforces regulations that it deems necessary to protect public health and safety and enhance the environment.

It is illegal to litter in the waterways in the State of Virginia.

Best Management Practices

- ★ Distribute clean boating sheets to boaters. These sheets can be found at the end of each chapter and there is space for the marina to put its logo and name.
- ★ Provide clear signage for recycling, trash, bathrooms, pumpouts, and showers so that boaters will not take the easy route and pollute.
- ★ Contact your local Coast Guard Auxiliary for brochures and advice about safe boating.
- ★ Train your employees so they can pass on information to boaters. The employees should at least be able to provide clean boating sheets to boaters. These sheets are found at the end of each chapter.
- ★ Include language in the boaters' contracts explaining the environmental policies of the marina.
- ★ Walk your docks and ask boaters if they have any questions.
- ★ Make a point of noticing pollution problems (i.e., sheens near boats). Point out to the boater activities that are not acceptable in your marina and provide advice on how to correct the problem.
- ★ Offer "green" cleaners for sale at your store.
- ◇ Hold workshops for issues of concern to you and/or your boaters.

Laws and Regulations

This chapter of laws, regulations, and permit information is by no means comprehensive. It is meant to provide:

- an introduction to the responsibilities of certain federal and state agencies;
- an overview of some relevant laws; and
- a synopsis of information about other pertinent permits and licenses.

Selected Federal Agencies and Their Jurisdictions

The **Environmental Protection Agency (EPA)** is responsible for ensuring that environmental protections are considered in U.S. policies concerning economic growth, energy, transportation, agriculture, industry, international trade, and natural resources; ensuring national efforts to reduce environmental risk are based on the best available scientific information; and providing access to information on ways business, state and local governments, communities, and citizens can prevent pollution and protect human health and the environment. The Office of Water is responsible for implementing, among other laws, the Clean Water Act, portions of the Coastal Zone Act Reauthorization Amendments of 1990, the Resource Conservation and Recovery Act, and the Marine Plastics Pollution Research and Control Act. Activities are targeted to prevent pollution wherever possible and to reduce risk to people and ecosystems in the most cost effective manner.

The mission of the **National Oceanographic and Atmospheric Administration (NOAA)**, an agency within the U.S. Department of Commerce, is to describe and predict changes in the earth's environment and to conserve and wisely manage the nation's coastal and marine resources to ensure sustainable economic opportunities. NOAA provides a wide range of observational, assessment, research, and predictive services for estuarine and coastal ocean regions. NOAA has developed an array of programs to address national-scale estuarine issues and specific problems affecting individual estuarine and coastal ocean systems. In partnership with EPA, NOAA implements the Coastal Zone Act Reauthorization Amendments of 1990.

The **United States Army Corps of Engineers (ACOE)** is responsible for ensuring adequate flood control, hydropower production, navigation, water supply storage, recreation, and fish and wildlife habitat. The Corps contracts and regulates coastal engineering projects, particularly harbor dredging and beach renourishment projects. They also review and permit coastal development and artificial reef projects. A permit from the Corps of Engineers is required for all dredging projects through the joint permit review process.

The **United States Coast Guard (USCG)**, an arm of the US Department of Transportation, protects the public, the environment, and US economic interests. They promote maritime safety and marine environmental protection, enforce maritime law, tend all Federal navigation aids, and regulate and monitor recreational and commercial vessels and waterfront facilities.

Selected State Agencies and Their Jurisdictions

The **Chesapeake Bay Commission (CBC)** is a tri-state legislative commission created in 1980 to advise the members of the General Assemblies of Maryland, Virginia, and Pennsylvania on matters of Bay-wide concern. Twenty-one members from three states define the commission's identity and its work. Fifteen of the members are legislators, five each from Maryland, Virginia, and Pennsylvania. Completing the ranks are cabinet secretaries from each state who are directly responsible for managing their states' natural resources, as well as three citizen representatives who bring with them a unique perspective and expertise. The commission serves as the legislative arm of the multi-jurisdictional Chesapeake Bay Program and acts in an advisory capacity to their respective General Assemblies.

The **Chesapeake Bay Local Assistance Department (CBLAD)** is the state agency which provides staff support to the local assistance board in carrying out the requirements of the Bay Act. The Bay Act established a cooperative program between state and local government aimed at reducing non-point source pollution. The Bay Act Program is designed to improve water quality in the Chesapeake Bay and its tributaries by requiring wise resource management practices in the use and development of environmentally sensitive land features. At the heart of the Bay Act is the idea that land can be used and developed in ways that minimize impact on water quality. Major department efforts in implementing the Bay Act include administering a competitive grants program for localities and planning districts, providing training for local government planners and engineers, and reviewing local comprehensive plans and ordinances for compliance.

The **Department of Environmental Quality (DEQ)** is dedicated to protecting Virginia's environment and promoting the health and well-being of the citizens of the Commonwealth. DEQ administers the requirements of the federal Clean Air Act, and enforces state law and regulations to improve Virginia's air quality. DEQ also administers the federal Clean Water Act and enforces state laws to improve the quality of Virginia's streams, rivers, bays and ground water for aquatic life, human health and other water uses. Permits are issued to businesses, industries, local governments and individuals that take into account physical, chemical and biological standards for water quality. Water programs address: pollution discharges, stormwater management, groundwater, petroleum tank vessels, petroleum storage tanks, surface water, land application of treated waste and dredged material. The *Office of Spill Response and Remediation* oversees spill reporting and response activities, and its above ground and under ground *Tank programs* regulate the handling and storage of petroleum and regulated substances. Solid wastes and hazardous wastes in Virginia are regulated by DEQ, the Virginia Waste Management Board, and the U.S. Environmental Protection Agency. They administer programs created by the federal Resource Conservation and Recovery Act, Comprehensive Environmental Response, Compensation and Liability Act (commonly called Superfund), and the Virginia Waste Management Act. DEQ also serves as the lead agency for *Virginia's networked Coastal Program*, which helps agencies and localities to develop and implement coordinated coastal policies.

The *VPDES Discharge Permit Program* and the *Virginia Water Protection Permit Program* are water quality programs DEQ administers under delegation to the Commonwealth of the federal Clean Water Act and as required by the State Water Control Law. The goal of these programs is to ensure the protection of the beneficial uses of state waters including nontidal wetlands, prevent degradation of valuable water resources and to work toward the restoration of waters whose quality has been degraded. The department issues permits for all activities which may result in the physical, biological or chemical alteration of state waters. Section 402 of the federal Clean Water Act established the National Pollutant Discharge Elimination System to limit pollutant discharges into streams, rivers, and bays. DEQ administers the program in Virginia and calls it the Virginia Pollutant Discharge Elimination System. DEQ requires VPDES permits for all point source discharges (such as ditches or pipes) to surface waters by businesses, governments or individuals. EPA maintains authority to review applications and permits for “major” dischargers, a distinction based on discharge quantity and content. The federal Water Quality Act of 1987 requires permits for certain industrial stormwater discharges and larger municipal stormwater systems. DEQ regulates these storm-water discharges also through VPDES permits. If a project requires a federal permit for discharges of dredged material into waterways or wetlands, or for other instream activities, DEQ will review the project for issuance of a Virginia Water Protection Permit, formerly called 401 certification.

The *Virginia solid waste management regulations* set standards for the siting, design, construction, operation, closure, and post-closure care of solid waste management facilities. The regulations cover facilities such as: landfills, transfer stations, composting facilities, mass burn incinerators, materials recovery facilities, solid waste experimental facilities, and waste storage piles. The *Virginia hazardous waste management regulations*, which closely follow federal standards established under RCRA, require permits for transportation, storage, treatment, and disposal of hazardous wastes. For some activities at a facility, portions of the permit are issued by EPA’s Region III office in Philadelphia. Regulations also govern the issuance of: transportation permits for hazardous waste and siting of hazardous waste management facilities. Virginia currently has no permitted hazardous waste disposal sites. DEQ also offers guidance on universal waste disposal; specifically, disposal of fluorescent lights.

DEQ regulates *aboveground and underground petroleum storage tanks* to ensure compliance with applicable regulations. The agency also manages all petroleum corrective action activities, including corrective action plan permits for cleanup of underground storage tank leaks, and reimbursement of eligible costs to responsible parties.

The *Virginia Water Protection Program* is responsible for the administration of the water quality programs delegated to the Commonwealth under the Clean Water Act and as required by the State Water Control Law. Under both state and federal law, the department functions as the principal water quality management agency within the Commonwealth of Virginia. The goal of the Virginia Water Protection Program is to ensure the protection of the beneficial uses of state waters including nontidal wetlands, prevent degradation of valuable water resources and to work toward the restoration of waters whose quality has been degraded. The department issues permits for all activities which may result in the physical, biological, or chemical alteration of state waters.

The Virginia Coastal Program, housed at DEQ, is more formally known as the Virginia Coastal Resources Management Program and was established in 1986. The Program is a network of natural resource agencies that each have some responsibility for implementing Virginia's coastal resources management laws and policies. Virginia's Coastal Program is reauthorized every four years by Executive Order signed by Virginia's governor. This Executive Order outlines the administration of the program, and maps out the responsibilities and mission of the program in a series of goals and objectives. As stated in Executive Order Number Twenty-Three (98), signed by Governor James S. Gilmore on June 1998, the goals of Virginia's Coastal Resources Management Program include:

- the prevention of environmental pollution and protection of public health;
- the prevention of damage to the Commonwealth's natural resource base;
- the protection of public and private investment in the Coastal Zone;
- the promotion of resources development and public recreation opportunities;
- and the provision of technical assistance and information.

The nine CORE PROGRAMS of the Virginia Coastal Resources Management Program are: Subaqueous Lands Management; Wetlands Management; Dunes Management; Fisheries Management; Nonpoint Source Water Pollution Control; Point Source Water Pollution Control; Shoreline Sanitation Control; Air Pollution Control; and Coastal Lands Management.

The **Virginia Department of Health (VDH)** administers regulations that govern the disposal of onsite sewage, drinking water, restaurants, classification of shellfish harvesting areas around your marina, and the provision of proper sanitary facilities to serve your customers. The Division of Wastewater Engineers also administers two grant programs to aid you in the operation of your facility. The Clean Vessel Aid Grant reimburses 75% of the cost to purchase and install pumpout and dump stations. The Boating Infrastructure Grant reimburses 75% of the cost to provide facilities to serve transient boaters.

The **Virginia Marine Resources Commission (VMRC)** serves the citizenry of the Commonwealth of Virginia by combining a public interest review process with effective management, regulation and protection of the state's marine fisheries, submerged lands (statewide) and coastal resources (tidal wetlands and coastal sand dunes/beaches). It is the goal of the commission's habitat management division to act as stewards of the Commonwealth's submerged lands and ensure the protection and wise use of these coastal lands and natural resources through the implementation of a regulatory review process and permitting program.

The **Virginia Department of Conservation and Recreation (DCR)** enhances natural and recreational resources through land management, funding, education and regulation. Nearly everyone in Virginia is touched by a DCR activity. The main program areas for DCR are State Parks, Natural Heritage, Soil and Water Conservation, Dam Safety and Recreational Planning.

Of special interest to marinas is the **Shoreline Erosion Advisory Service (SEAS)** program. Housed as a Soil and Water Conservation Program in the Department of Conservation and Recreation, the SEAS program provides technical advice regarding environmentally sound protective measures for shoreline erosion control. The SEAS service is available upon request to property owners throughout Virginia's tidal region.

Selected Federal Laws that Impact Marinas

Clean Air Act Amendments, 1990

As a result of the 1990 Clean Air Act Amendments, the "gasoline marine final rule" establishes emission standards for new spark-ignition gasoline marine engines. Outboard engines and gasoline marine engines used in personal watercraft and jet boats are covered by the rule. Because sterndrive and inboard engines offer cleaner technologies, emission standards were not set for these types of engines.

Boat engines currently in use are not affected by this regulation. Boat owners are in no way responsible for making modifications to their current engines to meet the standards. Likewise, boat dealers are not responsible for compliance with this regulation. The regulation does require that manufacturers of outboard and personal watercraft marine engines achieve yearly emission reductions by meeting a corporate average emission standard which allows them to build some engines to emission levels lower than the standard, provided the manufacturer's overall corporate average is at or below the standard.

Clean Vessel Act (CVA)

The Clean Vessel Act (CVA) provides funds to states to construct, renovate, and operate pumpout stations and to conduct boater environmental education. Contact the Virginia Department of Health for information about receiving up to 75% of the cost of installing a pumpout system.

Coastal Zone Act Reauthorization Amendments of 1990 (CZARA)

The Coastal Zone Act Reauthorization Amendments of 1990 (CZARA) provided the impetus for the Virginia Clean Marina Program. Section 6217 of the Amendments require that nonpoint source pollution from marinas be contained. Through the Clean Marina Program, Virginia is promoting voluntary adoption of best management practices to minimize the impact of marinas on surrounding land and water.

Federal Water Pollution Control Act

The Federal Water Pollution Control Act, commonly known as the Clean Water Act, addresses many facets of water quality protection. It provides the authority for the National Pollutant Discharge Elimination System (NPDES) permit program for point sources of pollution. The Act prohibits the discharge of oil or hazardous substances into U.S. navigable waters. It also prohibits the use of chemical agents like soaps, detergents, surfactants, or emulsifying agents to disperse fuel, oil, or other chemicals without permission of the U.S. Coast Guard.

All vessels 26 feet in length and over are required to display a placard that is at least 5 by 8 inches, made of durable material, and fixed in a conspicuous place in the machinery spaces or at the bilge pump control station. The placard must read:

Discharge of Oil Prohibited

The Federal Water Pollution Control Act prohibits the discharge of oil or oily waste into or upon the navigable waters of the United States or the waters of the contiguous zone if such discharge causes a film or sheen upon, or discoloration of, the surface of the water, or causes a sludge or emulsion beneath the surface of the water. Violators are subject to a penalty of \$5,000.

The Clean Water Act requires that the U.S. Coast Guard be notified anytime a spill produces a sheen on the water. Failure to report a spill may result in civil penalties.

The Act further requires that all recreational boats with installed toilets have an operable marine sanitation device on board.

Marine Plastic Pollution Research and Control Act (MPPRCA)

The Marine Plastic Pollution Research and Control Act (MPPRCA) is the U.S. law that implements an international pollution prevention treaty known as MARPOL. The MPPRCA of 1987 (Title II of Public Law 100-220) restricts the overboard discharge of garbage. Its primary emphasis is on plastics; it is illegal to dispose of plastic materials into the water anywhere. The disposal of other garbage is restricted according to the vessel's distance from shore.

- Within U.S. lakes, rivers, bays, sound, and within 3 nautical miles from shore, it is illegal to dump plastic, paper, rags, glass, metal, crockery, dunnage (lining and packing material, nets, lines, etc.), and food.
- Between 3 and 12 nautical miles from shore, it is illegal to dump plastic and any other garbage that is greater than one inch in size.
- Between 12 and 25 nautical miles from shore, it is illegal to dump plastic and dunnage.
- Beyond 25 nautical miles from shore, it is illegal to dump plastic.

The dumping restrictions apply to all vessels operating in *all* navigable waters of the United States and the 200-mile Exclusive Economic Zone. All vessels greater than 26 feet must display a MARPOL placard outlining the garbage dumping restrictions. All vessels over 40 feet must also have a written waste management plan on board.

Under the national law, ports and terminals, including recreational marinas, must have adequate and convenient "reception facilities" for their regular customers. That is, marinas must be capable of receiving garbage from vessels that normally do business with them (including transients).

National Flood Insurance Act

The National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 and the National Flood Insurance Program as set forth in the Code of Federal Regulations at 44 CFR.60.3.

Each locality that participates in the Federal flood Insurance Program prepares a study identifying the areas prone to flooding and the associated water depths and wave heights. This study becomes the basis for their Flood Plain Ordinance which must regulate and restrict construction within the flood plain.

Oil Pollution Act of 1990 (OPA)

The Oil Pollution Act of 1990 (OPA) was written in direct response to the *Exxon Valdez* oil spill. The law primarily addresses commercial oil shipping (i.e., tankers must be double hulled, captains may lose their licenses for operating a vessel under the influence of drugs or alcohol). Some of the requirements apply to recreational boating, however. Most notably, the responsible party for any vessel or facility that discharges oil is liable for the removal costs of the oil and any damages to natural resources; real or personal property; subsistence uses; revenues, profits and earning capacity; and public services like the cost of providing increased or additional public services. The financial liability for all non-tank vessels is \$600 per gross ton, or \$500,000, whichever is greater. Also, substantial civil penalties may be imposed for failing to report a spill, for discharging oil, for failure to remove oil, failure to comply with regulations, and gross negligence.

Organotin Antifoulant Paint Control Act (OAPC) of 1988

The Organotin Antifoulant Paint Control Act (OAPC) restricts the use of organotin antifouling paints, including tributyltin-based paints. Tributyltin (TBT) paints may be used only on aluminum-hulled vessels, on boats larger than 82 feet (25 meters), and on outboard motors and lower drive units.

Refuse Act of 1899

The Refuse Act of 1899 prohibits throwing, discharging, or depositing any refuse matter of any kind (including trash, garbage, oil, and other liquid pollutants) into waters of the United States.

Resource Conservation and Recovery Act (RCRA)

The Federal Resource Conservation and Recovery Act (RCRA) provides the legal authority to establish standards for handling, transporting, and disposing of hazardous wastes. The Virginia hazardous waste regulations are based on RCRA and the State Environmental Article.

Hazardous wastes are ignitable, corrosive, reactive, and/or toxic. Hazardous waste “generators” are those individuals or companies that produce greater than 100 kilograms (about 220 pounds or 30 gallons) of hazardous waste during one calendar month or who store more than 100 kg at any time. The following requirements apply to all hazardous waste generators:

- Any person or commercial business who intends to transport hazardous waste shipments that originate or terminate in Virginia must apply for a hazardous waste transporter permit from the Department of Environmental Quality.
- Store hazardous waste in UL listed or Factory Mutual approved containers that are labeled and marked according to Department of Transportation regulations (refer to 49 CFR 178). Mark the date accumulation begins on each container. Store containers on pallets to prevent corrosion in an area able to contain any leaks. Keep containers closed unless waste is being added or removed. Inspect containers weekly.
- Store quantities of waste greater than 100 kg (220 lbs) but less than 500 kg (1000 lbs) for a maximum of 180 days. Any quantity of waste greater than 500 kg can be stored for a maximum of 90 days.
- Prepare a written emergency contingency plan if you produce or accumulate more than 100 kg (220 lbs) of hazardous waste.
- Document all hazardous waste training in each employee's personnel file. All personnel who handle hazardous waste must receive training.
- Anybody who sends hazardous waste offsite for treatment, storage or disposal must prepare a manifest. Ensure that all of the information on the manifest is correct. The hazardous waste manifest must accompany all hazardous wastes "from cradle to grave." It is your responsibility to insure that the driver and the vehicle are certified to handle hazardous waste. Each transporter of the hazardous waste must receive and sign the manifest as should the owner or operator of the treatment, storage, or disposal facility. A final copy must be returned to the generator once the waste has been properly treated, stored, or disposed.
- Retain all records, including manifests and waste analysis and annual reports, for at least three years.

Facilities that generate less than 100 kg of hazardous waste per month and which do not accumulate more than 100 kg of waste at any one time are considered "small quantity generators." Small quantity generators are not required to register with the EPA. Hazardous waste from small quantity generators should be sent to a disposal facility that is permitted, licensed, or registered by the state to manage municipal or industrial solid waste.

Rivers and Harbors Appropriation Act of 1938

The Rivers and Harbors Act of 1938 (33 U.S.C. 540, and other U.S.C. sections; Chapter 535, June 20, 1938; 52 Stat. 802), provides for wildlife conservation to be given "due regard" in planning Federally authorized water resources projects. It also authorized more than 50 water projects.

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Appendix I—Information Sources

State Areas of Responsibility

Air Quality (Clean Air Act):

Department of Environmental Quality (800) 592-5482

Boating (Licenses and Safety)

Department of Game and Inland Fisheries (804) 367-1000

Chesapeake Bay (Protection, Program Status)

Alliance for the Chesapeake Bay (804) 775-0951

Chesapeake Bay Foundation (804) 780-1392

Department of Environmental Quality (800) 592-5482

Chesapeake Bay Preservation Act (Technical Assistance)

Chesapeake Bay Local Assistance Department (800) 243-7229

Planning/Zoning Office See County Listing

Coastal Resources

Department of Conservation and Recreation (804) 786-2064

Department of Environmental Quality (800) 592-5428

Coastal Program (804) 698-4185

Pollution Prevention (804) 698-4545

Marine Resources Commission (757) 247-2200

(Habitat Management)

Conservation of Natural Resources

Department of Conservation and Recreation (804) 786-2064

Virginia Association of Soil and (804) 559-0324

Water Conservation Districts

Endangered Species

Department of Conservation and Recreation

Division of Natural Heritage (804) 786-7951

Department of Game and Inland Fisheries (804) 367-1000

Environmental Legislation

Legislative Services, Virginia General Assembly (804) 698-1470

Erosion and Sediment Control and Stormwater Management

Planning/Zoning Office (Codes & Enforcement) See County Listing

Department of Conservation and Recreation (804) 786-2064

Division of Soil and Water Conservation

Fish (Fishing Licenses, Species Status)

Department of Game & Inland Fisheries (804) 367-1000

Department of Environmental Quality (Fish Kills) (800) 592-5482

Marine Resources Commission (757) 247-2200

Hazardous Spills

Department of Environmental Quality (Land) (800) 592-5482

U.S. Coast Guard (Water) (804) 441-3314

Leaking Storage Tanks

Dept of Environmental Quality (Bus. Hours) (800) 592-5482
Dept of Emergency Services (Non-bus. Hours) (800) 468-8892

Native Plants

Virginia Native Plant Society (540) 837-1600

Pesticides (Education, Regulations)

Virginia Cooperative Extension Service See County Listing
Office of Pesticide Management (804) 786-3798

Polluted Runoff (Nonpoint Source Pollution)

Soil & Water Conservation District See County Listing
Department of Conservation & Recreation (804) 786-2064
Division of Soil & Water Conservation
Department of Environmental Quality
Office of Pollution Prevention and Compliance Assistance (804) 698-4545

Preservation of Estuarine Habitats

Chesapeake Bay National Estuarine (804) 684-7135
Research Reserve in VA
Division of Natural Heritage (804) 786-7951

Preservation of Rare/Unique Habitats

The Nature Conservancy, Virginia Chapter (804) 295-6106
Division of Natural Heritage (804) 786-7951

River/Stream Pollution

Soil & Water Conservation District See County Listing
Department of Environmental Quality (800) 592-5482

Shoreline Erosion & Stabilization

Department of Conservation & Recreation (804) 786-2064
Shoreline Erosion Advisory Service (804) 786-2064
Soil & Water Conservation District See County Listing
Virginia Institute of Marine Science (804) 684-7108
Wetlands Section

Solid Waste Management & Recycling

Virginia Peninsulas Public Service Authority (757) 420-4700

Used Oil Recycling

Recycling Coordinator See Appendix VI

Wetlands (Preservation, Regulations)

Soil & Water Conservation District See County Listing
Chesapeake Bay Local Assistance Department (800) 243-7229
Marine Resources Commission (757) 247-2200
Department of Environmental Quality: (800) 592-5428
Nontidal Wetlands Program
Virginia Institute of Marine Science: (804) 642-7108
Wetlands Section

State Contacts

BayScapes Program

Alliance for the Chesapeake Bay

P.O. Box 1981

Richmond, VA 23218

(804) 775-0951

Fax (804) 775-0954

Email: acbva@acb-online.org

- BayScapes information including a list of beneficial plants

Chesapeake Bay Local Assistance Department

James Monroe Building

101 North 14th Street, 17th Floor

Richmond, VA 23219

(804) 225-3440 or (800) 243-7229

Fax (804) 225-3447

<http://www.cblad.state.va.us/>

Department of Emergency Management

Public Affairs Office

10501 Trade Court

Richmond, VA 23236

(804) 897-6510

<http://www.vdes.state.va.us/>

Department of Environmental Quality

Virginia Coastal Program

629 East Main Street, Richmond, VA 23219

P.O. Box 10009, Richmond, VA 23240

(804) 698-4185 or toll-free in Virginia, 1-800-592-5482

Fax (804) 698-4319

<http://www.deq.state.va.us/coastal/>

Chesapeake Bay Program

629 East Main Street

P.O. Box 10009

Richmond, VA 23240-0009

(804) 698-4312 or toll-free in Virginia, 1-800-592-5482

<http://www.deq.state.va.us>

Office of Pollution Prevention and Compliance Assistance

629 East Main Street

Richmond, VA 23219

(804) 698-4545

Fax (804) 698-4264

<http://www.deq.state.va.us/p2/>

Department of Conservation and Recreation

Division of Dam Safety

203 Governor Street, Suite 206

Richmond, VA 23219-2094

(804) 371-6095

Fax (804) 786-0536

<http://www.dcr.state.va.us>

Division of Natural Heritage

217 Governor St.
Richmond, VA 23219
(804) 786-7951
Fax (804) 371-2674
<http://www.state.va.us/~dcr>

Division of Soil and Water Conservation

203 Governor Street, Suite 206
Richmond, VA 23219-2094
(804) 786-2064
Fax (804) 786-1798
<http://www.dcr.state.va.us>

Shoreline Erosion Advisory Service (SEAS)
Urban Programs
Stormwater Program
Erosion & Sediment Control Program
Coastal Nonpoint Source Pollution Control Program
Clean Marina Program
Floodplain Management Program
Nonpoint Source Pollution Management Program

Chesapeake Bay Program

- Potomac Watershed Office
Warrenton, VA
(540) 347-6420
- Rappahannock Watershed Office
Fredericksburg, VA
(540) 899-4463
- York Watershed Office
Tappahannock, VA
(804) 443-6752
- Albemarle, Chowan & Coastal Watersheds Office
Suffolk, VA
(757) 925-2468
- James Watershed Office
Richmond, VA
(804) 371-5733

Local Planning District Commissions**Accomack-Northampton Planning District Commission**

P.O. Box 417
23372 Front Street
Accomac, VA 23301
(757) 787-2936

Crater Planning District Commission

1964 Wakefield Street
P.O. Box 1808
Petersburg, VA 23805
(804) 861-1666

Middle Peninsula Planning District Commission

Saluda Professional Center
P.O. Box 286
Saluda, VA 23149
(804) 758-2311

Northern Neck Planning District Commission

P.O. Box 1600
Warsaw, VA 22572-1600
(804) 333-1900

Hampton Roads Planning District Commission

Southeastern Office
723 Woodlake Drive
Chesapeake VA 23320
(757) 420-8300

RADCO Planning District Commission

P.O. Box 863
Fredericksburg, VA 22404
(540) 373-2890

Northern Virginia Planning District Commission

7535 Little River Turnpike
Suite 100
Annandale, VA 22003
(703) 642-0700

Virginia Cooperative Extension District Offices**Northeast District**

11 South 12th Street
Suite 210
Richmond, VA 23219-4035
Phone: (804)786-5802
Fax: (804) 786-5815

Counties: Westmoreland, Northumberland, Lancaster, Richmond, Middlesex, Mathews, Gloucester, York, Hampton, Newport News, James City, Charles City, New Kent, Henrico, Richmond City, Chesterfield, Powhatan, Goochland, Hanover, King William, King and Queen, Essex.

Northern District

Office Address:
70 Main Street
Suite 31
Warrenton, VA 20186

Mailing Address:
P.O. Box 701
Warrenton, VA 20188-0701
Phone: (540)341-7961
Fax: (540) 347-2534

Counties: Arlington, Alexandria, Fairfax, Loudoun, Prince William, Stafford, King George, Caroline, Spotsylvania, Louisa, Fluvanna, Nelson, Albemarle, Green, Madison, Rappahannock, Fauquier, Culpeper, Orange.

Southeast District

Cooperative Extension Building
First Floor, Suite 107
P.O. Box 9400
Virginia State University
Petersburg, VA 23806
Phone: (804) 524-5252
Fax: (804) 524-5452

Counties: Accomack, Northampton, Norfolk, Virginia Beach, Chesapeake, Suffolk, Isle of Wight, Southampton, Greensville, Sussex, Surrey, Prince George, Dinwiddie, Petersburg.

Virginia Department of Health

Division of Wastewater Engineering - Marina Program

1500 East Main Street
Suite 109
Richmond, VA 23219
(804) 786-1759
Fax (804) 786-5567 or (804) 225-4003
<http://www.vdh.state.va.us/>

Department of Shellfish Sanitation

Richmond Central Office
1500 East Main Street
Richmond, VA 23219
(804) 786-7937
Fax (804) 371-2891

Virginia Department of Game and Inland Fisheries

4010 West Broad Street
Richmond, VA 23230
(804) 367-1000
<http://www.dgif.state.va.us/>

Virginia Institute of Marine Science

Marina Technical Advisory Program

P.O. Box 1346
Rt. 1208 Greate Rd.
Gloucester Point, VA 23062
(804) 684-7768
Fax (804) 684-7161
<http://www.vims.edu>

Wetlands Program

Rt. 1208 Greate Rd.
Gloucester Point, VA 23062
(804) 684-7108
Fax (804) 684-7097
<http://www.vims.edu>

Virginia Marine Resources Commission

2600 Washington Avenue
Newport News, VA 23607-0756
(757) 247-2200
<http://www.state.va.us/mrc/page1.htm>

Federal Areas of Responsibility**Boating, Marina Services, Rescue**

US Coast Guard
(757) 398-6287

National Response Center
(800) 424-8802

Coastal Management

US Department of Commerce/NOAA
Office of Ocean & Coastal Resources Management
1305 East West Highway
Silver Spring, MD 20910
(301) 713-3117

Flora and Fauna, Habitat Protection

US Fish & Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401
(410) 224-2732

Pollution Abatement

US Environmental Protection Agency
Region III, Office of External Affairs
841 Chestnut Building
Philadelphia, PA 19107
(215) 597-9076

Federal Contacts**Army Corps of Engineers**

Norfolk District
803 Front Street
Norfolk, VA 23510-1096
(757) 441-7500
<http://www.usace.army.mil/>

Chesapeake Bay National Estuarine Research Reserve in Virginia

Virginia Institute of Marine Science
Rt. 1208 Greate Rd.
Gloucester Point, VA 23062
(804) 684-7135
Fax: (804) 684-7120
<http://www.vims.edu/cbnerr>

Federal Emergency Management Agency

500 C Street, SW
Washington, D.C. 20472
<http://www.fema.gov/>

Florida Sea Grant College Program

University of Florida
PO Box 110409
Gainesville, FL 32611
(352) 392-5870
Fax (352) 392-5113
<http://www.flseagrant.org/>

Minnesota Sea Grant College Program

1518 Cleveland Ave N #302
University of Minnesota
Saint Paul, MN 55108
(612) 625-1253
Fax (612) 625-1263

- Copy of *Composting Fish Waste* by Thomas Halbach & Dale Baker

Occupational Safety and Health Administration

VOSH - REGION 3
U.S. Department of Labor/OSHA
The Curtis Center-Suite 740 West
170 S. Independence Mall West
Philadelphia, PA 19106-3309
(215) 861-4900
Fax (215) 861-4904
<http://www.osha.gov/>

US Coast Guard**Commander, US Coast Guard**

District 5
431 Crawford Street,
Portsmouth, VA 23704
(757) 398-6287
<http://www.uscg.mil/>

- Copies of *Federal Requirements and Safety Tips for Recreational Boaters*

National Response Center

2100 Second Street, SW
Washington, DC 20593
1-800-424-8802

- Oil spill response

US Environmental Protection Agency**US Environmental Protection Agency**

Region III, Office of External Affairs
841 Chestnut Building
Philadelphia, PA 19107
(215) 597-9076
<http://www.epa.gov/>

- Information about Federal laws and regulations and EPA programs
- Visit the Oil Prevention Program's web page at www.epa.gov/oilspill for information about oil control laws and regulations

Chesapeake Bay Program

410 Severn Ave, #109

Annapolis, MD 21403

1-800-968-7229

<http://www.chesapeakebay.net>

- Annual workshops on up-to-date design methods and selection criteria for stormwater management structures

US Fish and Wildlife Service

Regional Office

300 Westgate Center Drive

Hadley, MA 01035-9589

(413) 253-8200

Fax (413) 253-8308

<http://www.fws.gov/>

Chesapeake Bay Field Office

177 Admiral Cochrane Drive

Annapolis, MD 21401

(410) 573-4500

Endangered/Threatened Species

- Federal endangered/threatened species
- Submit a USGS topographic quad with the proposed site marked and a brief project description
- List of native plant nurseries

Trade Associations

Chesapeake Bay Yacht Clubs Association

(540) 659-3275

<http://www.cbyca.org>

Virginia Association of Marine Industries

630 Country Green Lane

Charlottesville, VA 22902

(804) 977-3716

Tidewater Marine Trades Association

P.O. Box 40

Cobbs Creek, VA 23235

Non-Profit Groups

American Boat and Yacht Council (ABYC)

3069 Solomons Island Road

Edgewater, MD 21037

(410) 956-1050

Fax (410) 956-2737

<http://www.abycinc.org/index.cfm>

- Information about holding tank retrofits and vessel standards

Audubon

National Audubon Society

700 Broadway

New York, NY 10003

(212) 979-3000

Fax: (212) 979-3188

<http://www.audubon.org/>

Boat/US Clean Water Trust

880 South Picket Street

Alexandria, VA 22304

(703) 461-2855

Fax (703) 461-0920

<http://www.boatus.com/>

- Clean boating educational materials

Center for Marine Conservation

1725 DeSales Street, Suite 600

Washington, DC 20036

(202) 429-5609

<http://www.cmc-ocean.org/>

- Educational materials on marine debris
- Information on annual international coastal cleanup
(3rd Saturday in September)

Regional Office:

1432 North Greatneck Road

Virginia Beach, VA 23454

(757) 496-0920

Chesapeake Bay Foundation

Main Office:

162 Prince George Street

Annapolis, MD 21401

<http://www.savethebay.cbf.org/>

Richmond Office:

Capitol Place

1108 E. Main Street, Suite 1600

Richmond, VA 23219

(804) 780-1392

Hampton Roads Office:

142 West York Street, Suite 318

Norfolk, VA 23510

(757) 622-1964

- Oyster Restoration Program
- Storm drain stenciling information and materials
- Information about the annual international coastal cleanup

International Marine Institute

PO Box 1202
Nokomis, FL 34274
(941) 480-1212
Fax: (941) 480-0081
<http://www.imimarina.com/>

Marina Operators Association of America

1819 L Street N.W., Suite 700
Washington, D.C. 20036
(202) 721-1630
Fax (202) 721-1635
<http://www.moaa.com/>

National Fire Protection Association

One Batterymarch Park
PO Box 9101
Quincy, MA 02269-9101
1-800-344-3555
http://www.nfpa.org/public_affairs@nfpa.org

- Copies of NFPA standards
- Copies of NFPA standards may be available from your local fire marshall

National Marine Manufacturers Association

200 East Randolph Drive, Suite 5100
Chicago, IL 60601
(312) 946-6200
Fax: (312) 946-0388
<http://www.nmma.org/>

Sierra Club

85 Second Street, Second Floor
San Francisco CA, 94105-3441
(415) 977-5500
Fax (415) 977-5799
<http://www.sierraclub.org/>

States Organization for Boating Access

<http://www.soba.gen.dc.us/>

US Coast Guard Auxiliary

<http://www.cgaux.org/cgauxweb/public/pubframe.htm>

Virginia Marine Science Museum

717 General Booth Boulevard
Virginia Beach, Virginia 23451
(757) 425-3474
<http://www.vmsm.com>

Local Contacts

Wetlands Boards

Accomack County	(757) 787-5721
Town of Cape Charles	(757) 331-3259
Charles City County	(804) 829-9217
Chesapeake	(757) 382-6378
Colonial Heights	(804) 520-9275
Essex County	(804) 443-4951
Fairfax County	(703) 324-1210
Fredericksburg	(540) 372-1179
Gloucester County	(804) 693-4040
Hampton	(757) 727-6142
Hopewell	(804) 541-2267
Isle of Wight	(804) 357-3191
James City County	(757) 253-6673
King George County	(804) 775-7111
King and Queen County	(804) 785-5982
King William County	(804) 769-4927
Lancaster County	(804) 462-5220
Mathews County	(804) 725-5025
Middlesex County	(804) 758-4305
New Kent County	(804) 966-9861
Newport News	(757) 247-8437
Norfolk	(757) 441-2152
Northampton County	(804) 678-5872
Northumberland County	(804) 580-8910
Poquoson	(757) 868-7151
Portsmouth	(757) 393-8836
Prince William County	(804) 335-6830
Richmond County	(804) 333-3415
Stafford County	(804) 659-8668
Suffolk	(757) 934-3111
Surry County	(804) 294-5210
Virginia Beach	(757) 426-5790
Westmoreland County	(804) 493-0121
West Point	(804) 843-3330
Williamsburg	(757) 220-6130
York County	(757) 890-3538

Appendix II— Virginia's BayScapes Program

BayScapes is a program developed by the Alliance for the Chesapeake Bay and the U.S. Fish and Wildlife Service to promote actions that reduce inputs and other threats to water quality, and encourage the development of environmentally sound landscapes that benefit people, wildlife, and the Chesapeake Bay. The program teaches homeowners and others how to practice conservation landscaping, create wildlife habitat, use native plants, conserve water, create diversity, use integrated pest management, and plan for the long term.

The BayScapes Program also emphasizes strong participation from larger scale land managers, including federal, state, and local government facilities, corporate landowners, and communities. For marina owners and operators looking to better control nutrient-rich run-off and reduce nutrient and chemical inputs, the BayScapes landscape management approach provides very useful planting instructions and suggestions, appropriate plant selection guides for waterfront sites, and a wealth of information that can help produce positive long-term results within modest operating budgets.

BayScaping and Nutrient Management

All living organisms need nutrients, like nitrogen and phosphorus, to grow. Most people rely on fertilizers to provide these nutrients to lawns and gardens. Often, however, homeowners apply more fertilizer than is necessary or apply it at the wrong time. When that happens, wind and rain can carry excess nutrients off the land and into local waterways and, eventually, the Chesapeake Bay. In area lakes, such as Lake Anna, and in the Bay, excess nutrients stimulate rapid growth or blooms of algae. These blooms become so dense they block sunlight and rob the water of the oxygen needed by creatures and plants to survive.

So make sure you need fertilizers before using them. Soil from your yard should be tested for fertility every three years. For information on soil testing, contact your local Cooperative Extension office. If you do need to fertilize, never apply it on a windy day or if rain is expected within 24 hours.

For lawns, fertilize cool-season grasses in the autumn and warm-season grasses in early and mid-summer. Also, consider other ways to provide nutrients to your lawn and garden. For example, with proper mowing, lawn clippings will break down and naturally return nitrogen to the lawn.

Using Beneficial Plants

Beneficial plants are plants that require minimal maintenance—such as trimming, watering, fertilizers or pesticides—because they are well adapted to local climate and soil conditions. Because beneficial plants (many of which are native species) require less fertilizers and pesticides, their use reduces pollutants carried into local waterways. So, by planting beneficial plants in the landscape, you contribute to the health of local streams and the Chesapeake Bay.

BayScapes for Wildlife Habitat

BayScapes also improve habitat for wildlife. “Habitat” refers to the food, water, cover, and nesting sites needed by all living creatures to survive. Since many beneficial plants are also native, local birds, mammals, and other wildlife depend upon them for fruits, nuts, seeds, and breeding and nesting sites.

Through BayScaping and the use of beneficial plants, you can restore wildlife habitat in small pockets, one marina yard at a time. Together, these individual pockets join to form “greenways” or “greenbelts”—safe havens in which animals can live and move about.

BayScaping to Conserve Water

Keep in mind that when water runs off the land, it carries nutrients, sediments, and even traces of toxic substances into receiving creeks and streams across the watershed. Protecting the health of area streams rests on our ability to capture, reduce, or filter this runoff.

You can help by reducing the amount of water used to maintain your landscape, with little expense or effort. Key elements include timing, thoroughness of watering, use of proper equipment, and plant selection. Together, these decisions can cut your normal water use by as much as two-thirds during summer months.

Reducing Pesticide Use

Many natural and biological controls exist in the landscape to ward off insects and disease. Integrated Pest Management (IPM) uses a combination of biological, cultural, and chemical methods to control pests. While IPM does not totally eliminate the need for chemical pesticides in every situation, it can help reduce the volume of pesticides used on (and potentially running off) the land.

Prevention is fundamental to IPM and begins with plant selection. Many plants well adapted to the Chesapeake Bay region are available in disease and insect-resistant varieties. Your landscape is home to beneficial creatures that naturally prey upon pests. Spiders, lady beetles, wasps, big-eyed bugs, and praying mantises are just a few that depend on other insects for food. Birds, bats, frogs, lizards, and certain snakes also feed on insects. By choosing plants that encourage these creatures at your marina, other controls may not be necessary.

For more information, contact the BayScapes Program at:

P.O. Box 1981
Richmond, VA 23218
(804) 775-0951
Fax (804) 775-0954
Email: acbva@acb-online.org

Beneficial Plants for BayScaping in the Chesapeake Bay Region

This plant list is a guide to help you install your landscape plan. There are many more native plants that are suitable for BayScaping. Be careful to avoid invasive plants. Consult native plant lists for your region or your local nursery or agricultural extension agent for additional plants which may fit into your landscape.

LARGE TREE	BOTANICAL NAME	REGION	HEIGHT	BLOOM/FRUIT	SUN/SHADE	DRY/WET	VALUE
Red maple	<i>Acer rubrum</i>	all	75' – 100'	red bloom	sun – ps	w – d	very high wildlife, buffer
River birch	<i>Betula nigra</i>	piedmont & coastal	50' – 75'	catkin flower	ps – fs	w – m	wildlife, buffer, ornamental
Red or green ash	<i>Fraxinus pennsylvanica</i>	piedmont & coastal	50' – 75'		sun	m	buffer
Sweet gum	<i>Liquidambar styraciflua</i>	piedmont & coastal	50' – 75'	ornamental capsule	sun	m – w	wildlife, ornamental
Tuliptree	<i>Liriodendron tulipifera</i>	all	75' – 100'	yellow-green bloom	sun	d – m	buffer, ornamental
Black gum	<i>Nyssa sylvatica</i>	all	50' – 75'		sun – ps	d	ornamental, high wildlife
White oak	<i>Quercus alba</i>	all	75' – 100'	acorn fruit	sun	d – m	very high wildlife
SM. TREE/LG. SHRUB	BOTANICAL NAME	REGION	HEIGHT	BLOOM/FRUIT	SUN/SHADE	DRY/WET	VALUE
Shadblow serviceberry	<i>Amelanchier canadensis</i>	all	20' – 30'	deep black, edible fruit	sun – ps	d – m	very high wildlife, buffer
Eastern redbud	<i>Cercis canadensis</i>	mountains & piedmont	20' – 30'	pinkish bloom	sun – fs	d – m	ornamental
Flowering dogwood	<i>Cornus florida</i>	all	10' – 30'	white bloom/scarlet berries	sun – ps	d – m	wildlife, ornamental
Winterberry holly	<i>Ilex verticillata</i>	all	6' – 12'	red-berried fruit	ps	m – w	wildlife, ornamental
Witch hazel	<i>Hamamelis virginiana</i>	all	20' – 35'	yellow bloom-in fall	sun – ps	d	ornamental, borders
Northern bayberry	<i>Myrica pensylvanica</i>	piedmont & coastal	6' – 12'	waxy gray fruit	ps	d – w	high wildlife
Common elderberry	<i>Sambucus canadensis</i>	all	6' – 12'	white bloom/purple fruit	sun – fs	d – w	very high wildlife
Highbush blueberry	<i>Vaccinium corymbosum</i>	all - acid soil	3' – 10'	dark blue fruit	sun – fs	d – m	high wildlife, ornamental
Southern arrowwood	<i>Viburnum dentatum</i>	piedmont & coastal	6' – 12'	bluish-black fruit	sun – fs	m – w	wildlife, buffer, ornamental
EVERGREEN TREE/SHRUB	BOTANICAL NAME	REGION	HEIGHT	BLOOM/FRUIT	SUN/SHADE	DRY/WET	VALUE
American holly	<i>Ilex opaca</i>	coastal	30' – 50'	red berry	sun – ps	m	cover, high wildlife, orn.
Common juniper	<i>Juniperus communis</i>	all	2' – 30'	blue-black berry	sun	d	cover, high wildlife
Eastern red cedar	<i>Juniperus virginiana</i>	piedmont & coastal	50' – 75'	blue-green berry	sun	d	very high wildlife
Eastern white pine	<i>Pinus strobus</i>	mountains & piedmont	75' – 100'	five-needled bundle	sun	d	high wildlife, buffer
SMALL SHRUBS	BOTANICAL NAME	REGION	HEIGHT	BLOOM/FRUIT	SUN/SHADE	DRY/WET	VALUE
Bearberry	<i>Arctostaphylos uva-ursi</i>	mountains & piedmont	1'	red berries	ps	d	ornamental
Fothergilla	<i>Fothergilla gardenii</i>	all	3' – 5'	white bottlebrush flowers	sun – fs	m – w	ornamental
Inkberry holly	<i>Ilex glabra "Shamrock"</i>	all	4' – 6'	black berry	ps	d – w	evergreen, cover
Compact Oregon grapeholly	<i>Mahonia aquifolium "Compacta"</i>	all	2' – 3'	yellow flower, blue berries	ps – fs	m – w	evergreen, ornamental
Pinxterbloom azalea	<i>Rhododendron periclymenoides</i>	mountains - acid soil	6'	pink bloom	ps	m – w	ornamental
PERENNIAL	BOTANICAL NAME	REGION	HEIGHT	BLOOM/FRUIT	SUN/SHADE	DRY/WET	VALUE
Wild columbine	<i>Aquilegia canadensis</i>	all	8" – 24"	red & yellow flowers	sun – fs	d – m	wildlife, ornamental
Swamp milkweed	<i>Asclepias incarnata</i>	all	2' – 5'	pink-red flowers	sun – fs	m – w	wildlife, buffer
Butterfly weed	<i>Asclepias tuberosa</i>	all	1' – 3'	yellow to red flowers	sun	d	wildlife, ornamental
New England aster	<i>Aster novae-angliae</i>	all	3' – 4'	pink to violet flowers	sun	m	wildlife, ornamental
Tickseed	<i>Coreopsis verticillata</i>	all	1'	yellow flowers	fs	d – m	long flowering ornamental
Wild bleeding heart	<i>Dicentra eximia</i>	mountains & piedmont	8' – 12'	pink flowers	ps – fs	m	ornamental
Purple coneflower	<i>Echinacea purpurea</i>	all	2' – 3'	pink flower/seed heads	sun	d	wildlife, ornamental
Mistflower	<i>Eupatorium coelestinum</i>	all	3' – 4'	violet-blue flowers	fs	m – w	wildlife, buffer, ornamental
Joe-pye-weed	<i>Eupatorium fistulosum</i>	all	5' – 10'	pink-purple flowers	sun	m – w	wildlife, buffer, ornamental
Wild geranium	<i>Geranium maculatum</i>	mountains & piedmont	1' – 2'	rose-purple flowers	sun	m	ornamental
Gayfeather	<i>Liatris spicata</i>	all	2'	purple flower spikes	sun	d	ornamental, wildlife
Black-eyed susan	<i>Rudbeckia fulgida</i>	all	2' – 3'	yellow flowers	sun	d	wildlife, buffer, ornamental
Goldenrod	<i>Solidago rugosa</i>	all	2' – 7'	yellow flowers	sun – ps	d – m	wildlife, buffer
New York ironweed	<i>Vernonia noveboracensis</i>	all	Up to 7'	deep purple flowers	sun	m – w	wildlife, buffer, ornamental
GROUNDCOVER	BOTANICAL NAME	REGION	HEIGHT	BLOOM/FRUIT	SUN/SHADE	DRY/WET	VALUE
Green and gold	<i>Chrysogonum virginianum</i>	all	4" – 12"	yellow-green flowers	ps – fs	m	ornamental
Woodland phlox	<i>Phlox divaricata</i>	mountains & piedmont	6" – 18"	blue flowers, semi-evergreen	ps	m	wildlife, ornamental
Creeping phlox	<i>Phlox stolonifera</i>	all	3" – 4"	semi-evergreen	sun – ps	m	ornamental
Sensitive fern	<i>Onoclea sensibilis</i>	all	18" – 24"	dried brown spore-stalks	ps – fs	m – w	ornamental
Foamflower	<i>Tiarella cordifolia</i>	mountains & piedmont	6"	white flower	ps	m – w	ornamental
GRASS	BOTANICAL NAME	REGION	HEIGHT	BLOOM/FRUIT	SUN/SHADE	DRY/WET	VALUE
Switchgrass	<i>Panicum virgatum</i>	all	3' – 5'	seeds	sun	d	wildlife, ornamental
Little bluestem	<i>Schizachyrium scoparium</i>	all	up to 3'	seeds	sun	d	wildlife, ornamental
Indian grass	<i>Sorghastrum nutans</i>	all	5' – 6'	seeds	sun	d – m	wildlife, ornamental

LEGEND

VALUE:	Wildlife = provides food and/or shelter Buffers = for streamside or riparian areas Ornamental = attractive, decorative plant	SUN/SHADE:	sun = sun ps = partial shade fs = full shade	DRY/WET:	w = moisture m = moderate d = drought tolerant
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Appendix III—Funding Sources

Exemptions

Sales and Use Tax Exemption

Potential Applicants: Virginia state taxpayers

Availability/Conditions: Virginia offers exemption from paying a 4.5 percent combined state and local sales and use tax under the following conditions:

- Items purchased for resale by distributors
- Certified pollution control equipment facilities
- Custom computer software
- Purchases used in research and development
- Most film, video and audio production-related purchases
- Charges for Internet access, related communications services and sales of software via the Internet

Awarded by: Department of Environmental Quality

Local Property Tax Incentive for Certified Solar Energy and Recycling Equipment, Facilities, and Devices

Potential Applicants: Residential, commercial, or industrial property state taxpayers

Availability/Conditions: Any county, city, or town may exempt or partially exempt certified solar energy and recycling equipment from local property taxes. Eligible solar technologies include passive solar space heat, active solar water heat, active solar space heat, solar thermal electricity, and photovoltaics.

The local building department certifies solar equipment, facilities, or devices and the department of waste management certifies recycling equipment, facilities, or devices.

For more information contact your local certifying authority or Ken Jurman, Renewable Energy Program Manager, Department Mines, Minerals and Energy at 804/692-3222.

Grants

VDH-Clean Vessel Act for Pumpout and Dumpstations Funding

Potential Applicants: Water Dependent Businesses

- 75% funding (facility matches with 25%)
- Contact The Virginia Department of Health Marina Program
1500 East Main Street
Suite 109
Richmond, VA 23219
(804) 225-4018

Boating Infrastructure Grant For Funding to Install or Improve Facilities to Serve Transient Boaters

Potential Applicants: Water Dependent Businesses

Contact:
The Virginia Department of Health Marina Program
1500 East Main Street
Suite 109
Richmond, VA 23219
(804) 225-4018

Cooperative Service Business Enterprise Grants

Potential Applicants: Business and Industry

Availability/Conditions: The grant provides assistance for developing private business, industry, and related employment to improve the economy in areas and communities of less than 50,000 population. They help finance revolving funds, provide operating capital and finance to industrial sites in rural areas, give technical assistance, pay fees, and refinancing.

Typical project activities include developing pollution control and abatement incidental to site construction, water and wastewater systems, solid waste disposal, non-point source and other environmental facilities. They also might be used to help fund the cleanup and redevelopment costs associated with the redevelopment of brownfields properties and facilities, and to promote the beneficial uses of sludge on agricultural land.

Administered by: U.S. Department of Agriculture, Rural Business – Cooperative Service.

For more information, call 202/720-1400 or visit:
<http://www.rurdev.usda.gov/rbs/busp/rbeg.htm>.

Cooperative Service Economic Development Grants

Potential Applicants: Businesses and Industry

Availability/Conditions: Provides financial assistance promoting rural and economic development and job creation projects. Grant funding may be used for project feasibility studies, start-up costs, incubator projects, and other related reasonable expenses.

Examples of projects funded include establishment or expansion of factories or businesses, medical facilities, water and sewer industrial development parks, wastewater and drinking water utilities. These grants could be used to fund non-point source improvements and possibly solid waste and waste-to-energy facilities, as well as brownfields cleanup and redevelopment.

Administered by: The U.S. Department of Agriculture, Rural Business – Cooperative Service.

For more information, call 202/720-1400 or visit:
<http://www.rurdev.usda.gov/rbs/index.html>

Environmental Technology Initiative

Potential Applicants: Business and Industry

Availability/Conditions: Supports projects that promote improved public health and environmental protection by advancing the development and use of innovative environmental technologies. Innovative technologies that prevent pollution and focus on source reduction are supported by this initiative.

Administered by: The U.S. Environmental Protection Agency, Office of Policy, Planning, and Evaluation, Policy and Technology Innovations Division.

For more information, call (202) 260-2686 or visit:
<http://www.epa.gov/oppe/eti>.

Solar Photovoltaic Manufacturing Incentive Grant Program

Potential Applicants: Industry

Availability/Conditions: The grant offers up to \$4.5 million per year for the manufacture of photovoltaic panels in Virginia. The incentive is paid at a rate of up to 75 cents per watt for panels sold in a calendar year, up to six megawatts. The amount per watt that a manufacturer receives is based on the extent that the manufacturing process took place within the state. Companies receive benefits for a maximum of five years.

Administered by: The Virginia Department of Mines, Minerals, and Energy and the Virginia Economic Development Partnership.

For more information, contact Susan Thomas, Department of Mines, Minerals, and Energy, (804) 692-3226.

Sustainable Development Challenge Grants

Potential Applicants: Business and Industry

Availability/Conditions: The program funds projects that improve the environment, build sustainable futures for communities, help local economies and encourage partnerships among community groups, businesses, government and others. It targets projects yielding the greatest environmental and economic benefits, and leverage the most community investment and resources. The program could potentially fund the demonstration of a wide variety of environmentally and economically sustainable projects in all environmental media and program areas.

Administered by: The U.S. EPA, Office of Air and Radiation

For more information, contact Pamela Hurt at 202/260-2441.

Loans

Virginia Small Business Environmental Compliance Assistance Fund

Potential Applicants: Virginia Small Businesses

- 3% interest loan
- \$50,000 maximum
- Can be used for: 1) equipment to comply with the federal Clean Air Act 2) equipment to implement voluntary Pollution Prevention (p2) measures, or 3) equipment or structures to implement Agricultural Best Management Practices (BMPs).
- \$30 non-refundable application processing fee

Call the Department of Business Assistance at (804) 371-8184.

Pollution Control Loan

Potential Applicants: Virginia Small Businesses

Availability/Conditions: Pollution Control Loans are intended to provide loan guarantees to eligible small businesses to finance the planning, design, or installation of a pollution control facility. This facility must prevent, reduce, abate, or control any form of pollution, including recycling.

Administered by: The United States Small Business Administration

For more information, visit www.sbaonline.sba.gov

Tax Credits

Local Property Tax Incentive for Solar Energy Equipment

Potential Applicants: Commercial, Industrial, and Residential Virginia Property Taxpayers

Availability/Conditions: The legislative code offers 58.1-3661 offers tax exemption or partial exemption on purchases of solar energy equipment or recycling equipment from property taxes. Solar energy equipment is any "application which would otherwise require a conventional source of energy." This includes passive solar space heat, active solar water heat, active solar space heat, solar thermal electricity, photovoltaics. Recycling equipment is any equipment that is "integral to the recycling process and for use primarily for the purpose of abating or preventing pollution of the atmosphere or waters."

Administered by local county, city, or town government. Contact your local government for more information.

Waste Motor Oil Burners

Potential Applicants: Virginia Business facilities that accept waste motor oil from the public

Availability/Conditions: A credit is offered for equipment used exclusively for burning waste motor oil at a business facility. The credit is equal to fifty percent of the purchase price paid during the taxable year. The total credit allowed to any taxpayer under this section in any taxable year will not exceed \$5,000.

The taxpayer must submit with his income tax return such receipts, invoices, and other documentation necessary to confirm the taxpayer's statement of the purchase price paid for the waste motor oil burning equipment. The tax credit is only applicable to the taxable year during which the equipment was purchased.

Administered by:

The VA DEQ will certify that the equipment is used to burn waste motor oil at a business facility in Virginia and accepts waste motor oil from the public. For more information contact Dan Gwinner at 804/698-4218.

Appendix IV—6217(g)

Guidance Management Measures

Management Measures (def.) “economically achievable measures to control the addition of pollutants to our coastal waters, which reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives.”

1. Siting and Design

Marina Flushing

- Site and design marinas such that tides and/or currents will aid in the flushing of the site or renew its water regularly.

Water Quality Assessment

- Assess water quality as part of marina siting and design.

Habitat Assessment

- Site and design marinas to protect against adverse effects on shellfish resources, wetlands, submerged aquatic vegetation, or other important riparian and aquatic habitat areas as designated by local, state, or federal governments.

Shoreline Stabilization

- Where shoreline erosion is a nonpoint source pollution problem, shorelines should be stabilized. Vegetative methods are strongly preferred unless structural methods are more cost effective, considering the severity of wave and wind erosion, offshore bathymetry, and the potential adverse impact on other shorelines and offshore areas.

Storm Water Runoff

- Implement effective runoff control strategies which include the use of pollution prevention activities and the proper design of hull maintenance areas.
- Reduce total suspended solids (TSS) in runoff from hull maintenance areas by 80 percent. For the purposes of this measure, an 80 percent reduction of TSS is to be determined on an average annual basis.

Fueling Station Design

- Design fueling stations to allow for ease in cleanup of spills.

Sewage Facility

- Install pumpout, dump station, and restroom facilities where needed at new and expanding marinas to reduce the release of sewage to surface waters. Design these facilities to allow ease of access and post signage to promote use by the boating public.

2. Marina and Boat Operation and Maintenance

Solid Waste

- Properly dispose of solid wastes produced by the production, cleaning, maintenance, and repair of boats to limit entry of solid wastes to surface waters.

Fish Waste

- Promote sound fish waste management through a combination of fish-cleaning restrictions, public education, and proper disposal of fish waste.

Liquid Waste

- Provide and maintain appropriate storage, transfer, containment, documentation and disposal facilities for liquid material, such as oil, harmful solvents, antifreeze, and paints, and encourage recycling of these materials.

Petroleum Control

- Reduce the amount of fuel and oil from boat bilges and fuel tank air vents entering marina and surface waters.

Boat Cleaning

- For boats that are in the water, perform cleaning operations to minimize, to the extent practicable, the release to surface waters of (a) harmful cleaners and solvents and (b) paint from in-water cleaning.

Public Education

- Public education/outreach/training programs should be instituted for boaters, as well as marina owners and operators, to prevent improper disposal of polluting material.

Maintenance of Sewage Facilities

- Ensure that sewage pumpout facilities are maintained in operational condition, locally situated for convenience, and encourage their use.

Boat Operation

- Restrict boating activities where necessary to decrease turbidity and physical destruction of shallow-water habitat.

Appendix V—Recycling Coordinators

This information was taken from the Virginia Department of Environmental Quality's web page (www.deq.state.va.us/recycle/r-coord.html)

Accomack County

Mr. Joseph E. Robbins
18050 Robbins Lane
Onancock, VA 23417
(757) 787-3836
FAX (757) 787-2468

Arlington

Ms. Margaret Eldridge
Recycling Coordinator
4300 29th Street, South
Arlington, VA 22206
(703) 228-6491
FAX (703) 228-6493

Charles City

Mr. John T. Bragg, Jr.
Recycling Coordinator
P.O. Box 66
Charles City, VA 23030
(804) 829-9298
FAX 804/829-5819

Colonial Heights

Mr. Kurt Ankrom
Litter Control & Recycling Coordinator
P.O. Box 3401
Colonial Heights, VA 23834
(804) 520-9372
FAX (804) 520-9230

Fairfax

Ms. Tanis Skislak
Recycling Coordinator
12000 Govt Ctr Pkwy, Suite 458
Fairfax, VA 22035
(703) 324-5040
FAX (804) 344-5436

Falls Church

Ms. Annette Mills
Litter Prevention & Recycling Coordinator
300 Park Avenue
Falls Church, VA 22046
(703) 241-5176
FAX (703) 241-5184

Alexandria

Ms. Denise Bretchen
1108 Jefferson Street
Alexandria, VA 22314
(703) 751-5872
FAX (703) 838-6344

Caroline

Mr. Alan Partin
County Administration
P.O. Box 182
Port Royal, VA 22535
(804) 633-5380
FAX (804) 633-4970

Chesapeake

Ms. Gail Bradshaw
Recycling Coordinator
P.O. Box 15225, 112 Mann Dr.
Chesapeake, VA 23328
(757) 382-6411
FAX (757) 382-6012 &
382-8418

Essex

Mr. Larry E. Smith
Litter Prevention Coordinator
P.O. Box 1079
Tappahannock, VA 22560
(804) 443-4331
FAX (804) 443-4157

Fairfax City

Mr. Glen Shelton
Operations Director
10455 Armstrong Street
Fairfax, VA 22030
(703) 385-7995
FAX (703) 591-5727

Fredericksburg

Recycling Coordinator
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Gloucester

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Hanover

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Hopewell

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James City County

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Williamsburg, VA 23188
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King George

Ms. Jo Turek
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Lancaster County

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Manassas Park

Mr. Troy E. Taylor
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Hampton

Ms. Deborah Blanton
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Henrico County

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Isle of Wight County

Mr. Don Robertson
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King & Queen County

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King William County

Ms. Kitty Cox
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Manassas

Mr. Billy Swartz
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Mathews County

Mrs. Betty W. Day
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Middlesex County

Ms. Joan Curtis
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Newport News

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Northumberland

Mr. John Burton
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Petersburg

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Poquoson

Mr. Bob Kerlinger
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20 Roberts Landing Drive
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Prince George

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New Kent County

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Norfolk Environmental Commission

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Poquoson

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Portsmouth

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**Prince William County
Clean Community**

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Richmond

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Stafford County

Ms. Diane L. Jones
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Surry

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Warsaw

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York

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Richmond

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Spotsylvania

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Suffolk

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Virginia Beach

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Williamsburg

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Appendix VI— Sample Contract Language

The following text is based on the Marine Trades Association of New Jersey's *Best Management Pledge*. The language may be incorporated into lease agreements.

For Tenants:

I, _____, understand that _____
(name) (marina/boatyard)

subscribes to and enforces pollution prevention procedures. I further understand and agree that in return for the privilege of performing work on a boat at this facility such as hull cleaning, washing, sanding, polishing and/or painting; bottom cleaning, sanding, scraping, and/or painting; opening the hull for any reason, i.e., installation of equipment or engine work; engine and/or stern drive maintenance, repair, painting; etc., it is my responsibility to comply with, at a minimum, the following pollution prevention practices. I understand that this list may not be complete and pledge that I will exercise common sense and judgment in my actions to insure that my activities will not deposit pollution residues in surface waters or elsewhere where they may be conveyed by stormwater runoff into the surface waters. I understand that failure to adopt pollution prevention procedures may result in expulsion from the marina/boatyard (*insert name of facility*) and forfeiture of rental fees. I understand that I may elect to employ the facility to perform potential pollution producing activities on my behalf in which case the responsibility for compliance with the best management practices is entirely theirs.

Signed _____ Date _____

For Sub-Contractors Only:

I understand and agree to have my proposed work first authorized by this facility and that I will adhere, at a minimum, to the contents of this document. I further understand that because of the nature of my proposed work, the facility may require that I be supervised by an employee of said facility for which I will pay the normal existing labor rate.

Signed _____ Date _____

Pollution Prevention Practices:

- **Repairs and Service** (to hull and engine; painting, cleaning, washing, sanding, scraping, etc.)
 - Work on hulls and engines only in designated areas or use portable containment enclosures with approval of marina management.
 - Use tarps and vacuums to collect solid wastes produced by cleaning and repair operations—especially boat bottom cleaning, sanding, scraping, and painting.
 - Conduct all spray painting within an enclosed booth or under tarps.
 - Use non-toxic, biodegradable solvents.
 - Capture debris from boat washing and use only minimal amounts of phosphate-free, non-toxic, and biodegradable cleaners.
 - Use drip pans for any oil transfers, grease operations, and when servicing I/Os and outboard motors.
 - Obtain management approval before commencing any repair which will open the hull. Clean and pump bilges free of contaminated materials before and after repairs which open the hull.
 - Use spill proof oil change equipment.
- **Vessel Maintenance Waste**
 - Non-toxic residue of sanding, scraping, and grinding: bag and dispose of in regular trash.
 - Toxic and non-environmentally safe solvents and cleaning liquids: seek specific directions from marina management or dispose of with licensed agency.
- **Fuel Operations**
 - Install fuel/air separator on fuel tank vent line(s) to prevent overflow of fuel through vent.
 - Keep petroleum absorbent pad(s) readily available to catch or contain minor spills and drips during fueling.
- **Waste Oil and Fuel**
 - Recycle used oil and antifreeze.
 - Add a stabilizer to fuel tank in the fall or an octane booster to stale fuel in the spring. Use the fuel or bring it to a household hazardous waste collection site.
 - Absorbent materials soaked with oil or diesel: drain liquid and dispose of in used oil recycling container; double bag absorbent material in plastic and dispose in regular trash receptacle.
 - Absorbent materials soaked with gasoline (flammable): air dry and reuse.
 - Bioremediating absorbent products: dispose in regular trash as long as no liquid is dripping. Because the microbes need oxygen to function, do not seal in plastic.

- Oil filters: drain and recycle the oil; recycle the filter or double bag and put in regular trash.
- **Onboard Practices**
 - Maintain oil absorbent pads in bilge. Inspect no less than annually.
 - Do not discharge bilge water if there is a sheen to it.
 - Use only low-toxic antifreeze (propylene glycol). Recycle used antifreeze (even low-toxic antifreeze will contain heavy metals once it has been used).
- **Sewage Handling**
 - Never discharge raw sewage within Virginia waters.
 - If you have an installed toilet, you must have an approved Marine Sanitation Device (MSD).
 - Do not discharge Type I or Type II marine sanitation devices within the marina basin.
 - Use marina restroom facilities when at slip.
 - Do not empty port-a-pots overboard; use marina dump facility. Do not empty port-a-pots in the restrooms.
 - Do not discharge holding tanks overboard; use pumpout facilities.
 - If you must use a holding tank additive, use an enzyme-based product. Avoid products that contain quaternary ammonium compounds (QACs), formaldehyde, formalin, phenal derivative, alcohol bases, or chlorine bleach.
 - Liveaboards, place a dye tablet in holding tank after each pumpout. The dye will make any illegal discharges clearly visible.
- **Organic Waste**
 - Clean fish only in designated areas.
 - Grind, compost, or double bag fish scraps (*depending on the services offered by your marina*).
 - Walk pets in specified areas and dispose of their wastes, double bagged, in the dumpster.
- **Solid Waste**
 - Recycle plastic, glass, aluminum, newspaper, and used lead batteries (*tailor this section to fit your facility's practices*).
 - Place trash in covered trash receptacles; replace covers.

